

Wireless Smoke Detector

Model No.:

- 1.FWD-200ACCLIMATE**
- 2.FWD-200P**
- 3.FWH-200FIX135**

Date: 2017-06-16

Report Prepared By:

Christopher Locke

EMC Test Report

Report Number	20295-1
EUT Nomenclature	Wireless Smoke Detector
Sample Identification	Model No. : FWD-200ACCLIMATE Sl. No. : MEL-150 Model No. : FWD-200P Sl. No. : MEL-147 Model No. : FWD-200FIX135 Sl. No. : MEL-153 Software Version : 5.83 Hardware Version : Rev D
Number of Samples	3
Date of receipt of Sample	2016-08-01
Condition of Sample on receipt	Good
Client name	Honeywell International Inc.
Client Address	System Sensor, 3825, Ohio Ave, St. Charles , IL, USA - 60174
Testing Laboratory	Honeywell Home & Building Technologies RF & EMC HWVA
Address	2 Corporate Center Dr. Suite 100 PO Box 9040 Melville, NY 11747 USA
Test Dates	2016-08-02 to 2017-04-24
Applicable Standard	FCC Part 15 :2010 ,ANSI C63.10:2013
Test Results	PASS

Prepared By: Name: Christopher Locke  Signature: Christopher Locke Date: 2017-06-16	Reviewed By: Name: Michael Antola  Signature: Michael Antola Date: 2017-06-16
Authorized By: Name: Ted Ramos  Signature: Ted Ramos Date: 2017-06-16	
This Report relates to the above mentioned test sample only. Without the approval of Lab manager, this report shall not be reproduced except in full.	

TEST SUMMARY						
#	Name	Specification	Test Method	Pass	Fail	NA
FHSS						
1	20dB Bandwidth	FCC Part 15.247 :2010	DA 00-705	☒	☐	☐
2	Maximum Peak Output Power	FCC Part 15.247 :2010	DA 00-705	☒	☐	☐
3	Carrier Frequency Separation	FCC Part 15.247 :2010	DA 00-705	☒	☐	☐
4	Number of Hopping Frequencies	FCC Part 15.247 :2010	DA 00-705	☒	☐	☐
5	Band-edge Compliance	FCC Part 15.247 :2010	DA 00-705	☒	☐	☐
6	Time of Occupancy (Dwell Time)	FCC Part 15.247 :2010	DA 00-705	☒	☐	☐
7	Spurious RF Conducted Emissions	FCC Part 15.247 :2010	DA 00-705	☒	☐	☐
8	Spurious Radiated Emissions	FCC Part 15.247 :2010 and 15.209 :2010	DA 00-705 ANSI C63.10.2013	☒	☐	☐
9	Effective Isotropic Radiated Power	FCC Part 15.247 :2010 and 15.209 :2010	KDB 412172	☒	☐	☐
DTS						
1	DTS 6dB Bandwidth	FCC Part 15.247	KDB 558074	☒	☐	☐
2	Maximum Peak Output Power	FCC Part 15.247	KDB 558074	☒	☐	☐
3	Maximum Power Spectral Density	FCC Part 15.247	KDB 558074	☒	☐	☐
4	Band-edge Conducted Emissions	FCC Part 15.247	KDB 558074	☒	☐	☐
5	Radiated Spurious Emissions	FCC Part 15.247 :2010 and 15.209 :2010	KDB 558074 ANSI C63.10:2013	☒	☐	☐
6	Effective Isotropic Radiated Power	FCC Part 15.247 :2010 and 15.209 :2010	KDB 412172	☒	☐	☐

MEASUREMENT UNCERTAINTY		
Where relevant, the following measurement uncertainty levels has been estimated for tests performed on the EUT as specified in CISPR 16-4		
The Expanded measurement uncertainty (K=2) is provided below		
#	Name	Value
1	20dB and 6dB bandwidth	± 0.22 dB
2	Maximum Peak Output Power	± 0.22 dB
3	Maximum Power Spectral Density	± 0.22 dB
4	Band-edge Emissions	± 0.22 dB
5	Spurious RF Conducted Emissions	± 0.22 dB
6	Radiated Spurious Emissions <1GHz	± 10.92 dB
7	Radiated Spurious Emissions >1GHz	± 8.53 dB

1 PRODUCT DETAILS

PRODUCT OPERATION AND INTENDED USE

The Wireless Smoke Detector is powered by four CR123A batteries. It has a sensor head to detect smoke and LEDs to indicate activation and trouble

RATINGS AND SYSTEM DETAILS

Operating Frequency	902MHz to 928MHz	
Number of Channels	DTS	:6
	FHSS	:55
Channel Bandwidth (20 dB)	DTS	:1MHz
	FHSS	:320kHz
Transmitted Power	DTS	:12dBm
	FHSS	:17dBm
Modulation Type	FSK	
Data Rate	DTS	:300Kbps
	FHSS	:150Kbps
Antenna Type	Inverted F Patch Antenna	
No. of Antenna	3	
Antenna Gain	ANT1	:5.18dBi
	ANT2	:4.9dBi
	ANT3	:4.8dBi
Supply Voltage and Current	3.3Vdc, 24mA	
Dimensions (Diameter x Height)	4 inch x 2.1 inch	
Environmental Conditions	Operating Temperature	:0°C to 50°C
	Storage Temperature	:-10°C to 60°C
	Humidity	:10% to 93% RH

TEST CONFIGURATION

Config #	Description
Conducted Test	EUT is Powered by external 3.3V power supply. EUT Debug port (UART) is connected to Laptop through USB to UA RT converter cable. EUT is configured to the respective operating mode through Hyper Terminal. Test is performed at Antenna 1 as this is the high gain antenna
Radiated Test	EUT is Powered from Battery. EUT Debug port (UA RT) is connected to Laptop through USB to UA RT converter cable. EUT is configured to the respective operating mode through Hyper Terminal. Test is performed at all 3 antennas

OPERATING MODES

Mode #	Description
DTS	Following DTS channels have been used for Conducted (Continuous Transmission) and Radiated (Continuous Transmission) Tests Channel 1 : 902.875MHz Channel 3 : 914.325MHz Channel 6 : 927.125MHz
FHSS	Following FHSS channels have been used for Conducted (Continuous Transmission) and Radiated (Continuous Transmission) Tests Channel 1 : 903.55MHz Channel 28 : 916.00MHz Channel 55 : 926.45MHz

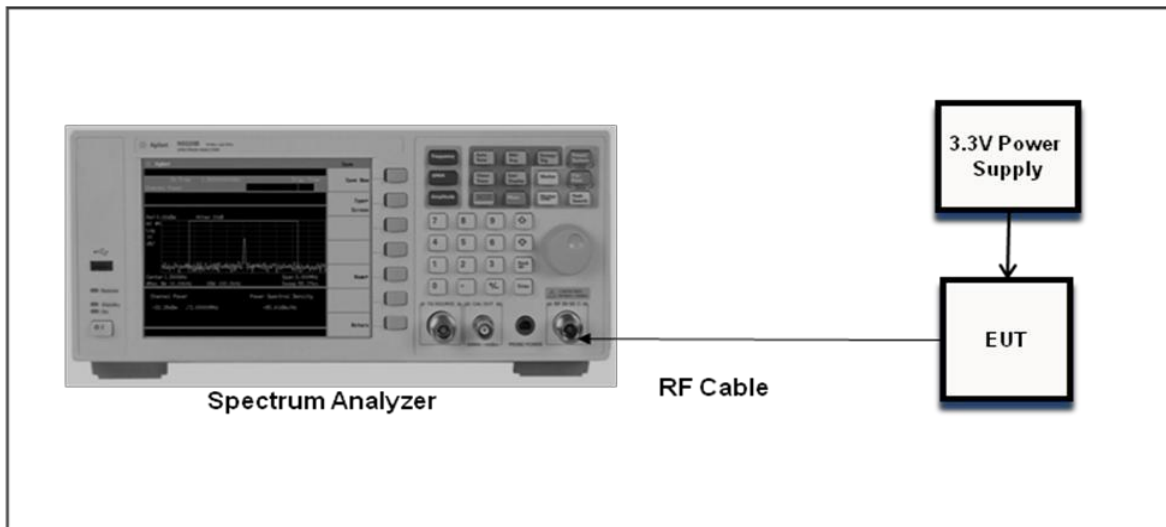
INPUT AND OUTPUT CABLES

Port #	Name	Port Type	Cable Length	Cable type Shielded/ Unshielded	Comments
	Not Applicable				
*Note:	AC = AC Power Port TP = Telecommunication Ports (e.g. Ethernet) N/E = Non-Electrical			DC DI/ DO AI/	= DC Power Port = Digital Input/ Output = Analog Input/ Output

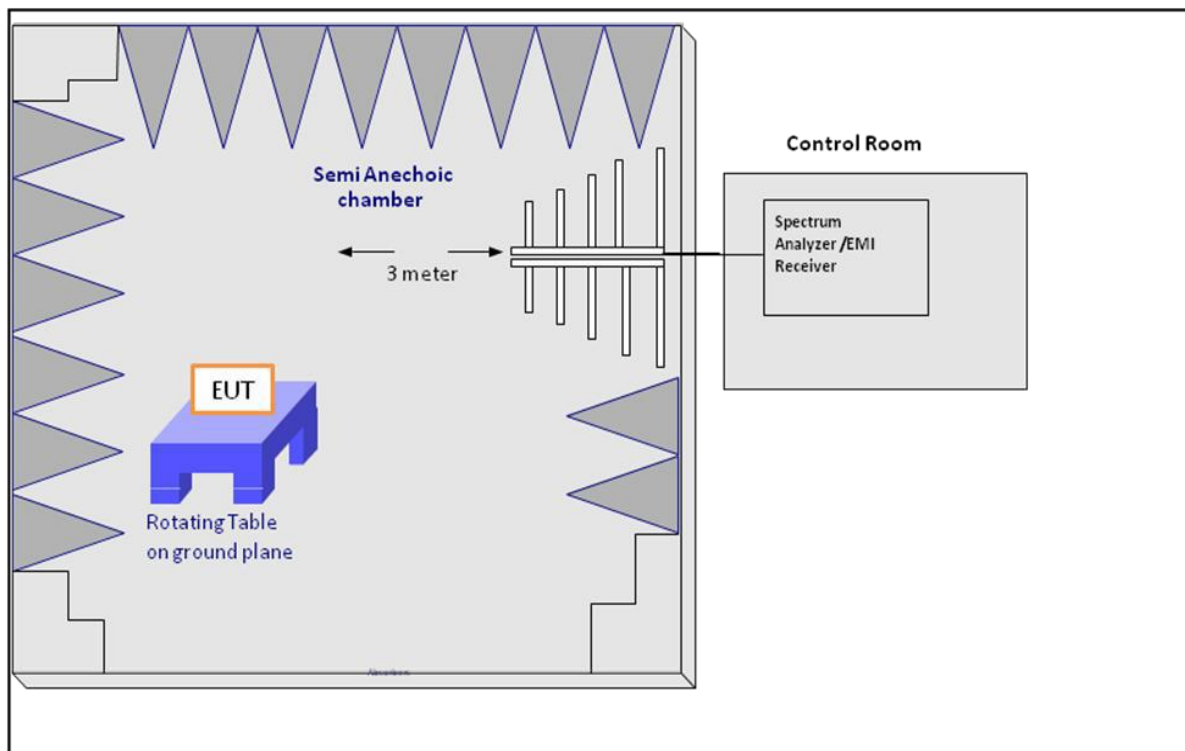
SUPPORT EQUIPMENTS AND ACCESSORIES USED

#	Item Description	Make	Model	Part No. / SI. No	Cal Due Date
1	Laptop	Dell	CORPMDTW10X64IMAGEV2	339YSC2	NA
2	USB to UART Cable	FTDI	NA	TTL-232R-3V3	NA
3	DC Power Supply	HP	E3611A	KR83015320	NA

CONNECTION DIAGRAM AND SETUP DIAGRAM



Conducted RF Test Setup



Radiated Emission Test Setup

Wireless Acclimate Smoke Detector

2 FHSS CHANNELS

2.1 20dB BANDWIDTH

EUT Nomenclature	Wireless Smoke Detector	Test Request No.	20295-1
Model No.	FWD-200ACCLIMATE	Serial No.	MEL-150
Test Start Date	2016-08-24	Temperature (°C)	23.6°C
Test End Date	2016-08-24	Humidity RH (%)	51.9%RH
Tested By	Jose Badia/Arnoldo Garcia	Pressure (mbar)	NR
Input Voltage / Freq.	3.3 Vdc		
Operating Mode	Refer Page 5 for Operating Mode Table		
Test configuration	Refer Page 5 for Test Configuration Table		
Deviation from Std.	NA		
Applicable standard	FCC Part 15.247 :2010		
Test Method	DA 00-705		
Comment	NA		

TEST DETAILS

Method	Radiated ☐	Conducted ☒
--------	-----------------------------------	---

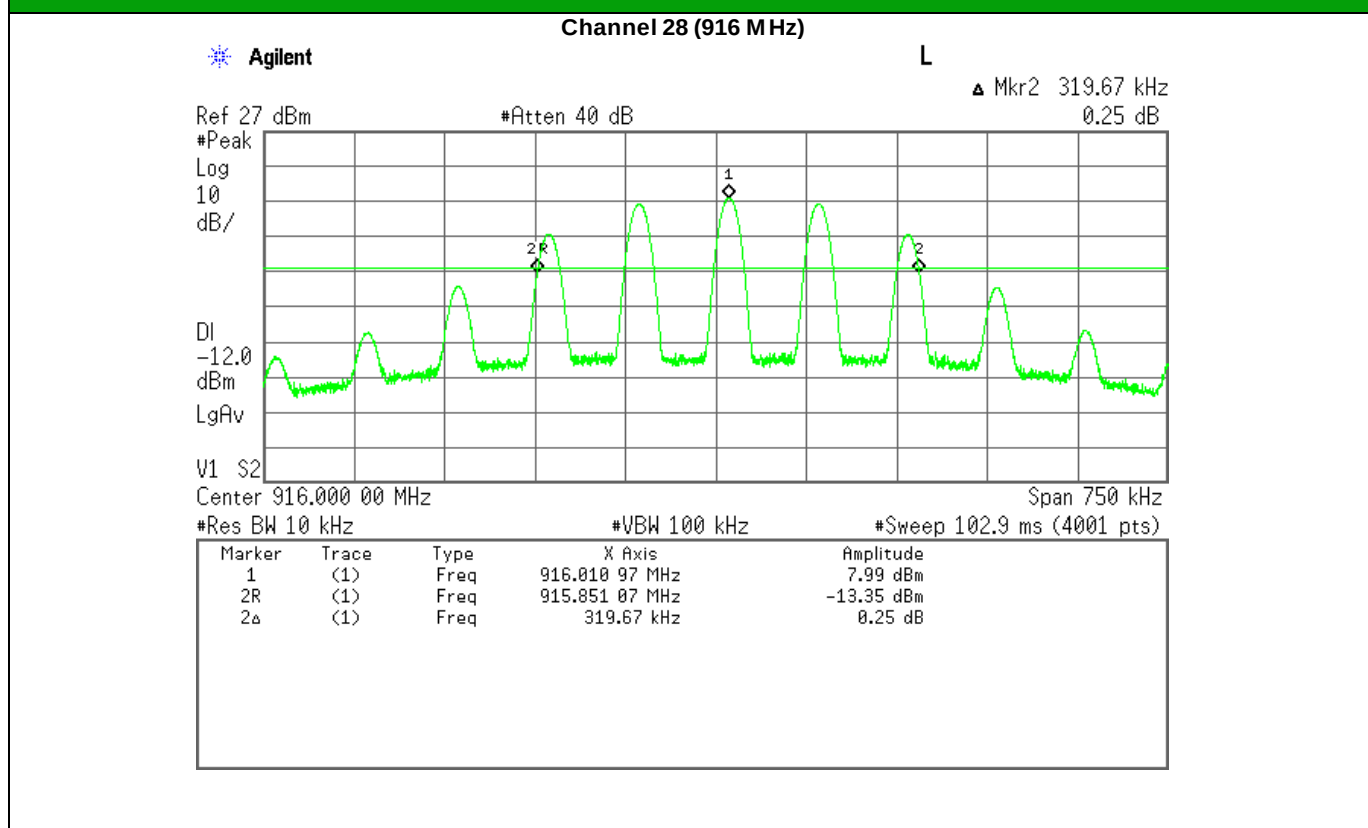
TEST PARAMETERS

Antenna Height	NA	Turntable Rotation	NA
Equipment Class	NA	Measurement Distance	NA

TEST EQUIPMENT

Y/N	Equipment	Make	Model	Serial Number	Cal Due Date
Y	Spectrum Analyzer	Agilent	E4440A	MY41000078	2017-05-18
Y	RF Cable	Digikey	1	NA	NA

TEST GRAPHS



TEST RESULT

Channel	Frequency	Measured Bandwidth	Limit	Result
#	MHz	KHz	KHz	
28	916	319.67	≥250 & ≤500	PASS

TEST SETUP PHOTOGRAPH

Refer Annexure -1

Conducted RF Test setup

2.2 PEAK OUTPUT POWER

EUT Nomenclature	Wireless Smoke Detector	Test Request No.	20295-1
Model No.	FWD-200ACCLIMATE	Serial No.	MEL-150
Test Start Date	2016-08-02	Temperature (°C)	23.6°C
Test End Date	2016-08-03	Humidity RH (%)	51.9%RH
Tested By	Jose Badia/Arnoldo Garcia	Pressure (mbar)	NR
Input Voltage / Freq.	3.3 Vdc		
Operating Mode	Refer Page 5 for Operating Mode Table		
Test configuration	Refer Page 5 for Test Configuration Table		
Deviation from Std.	NA		
Applicable standard	FCC Part 15.247 :2010		
Test Method	DA 00-705		
Comment	NA		

TEST DETAILS

Method	Radiated ☐	Conducted ☒
--------	-----------------------------------	---

TEST PARAMETERS

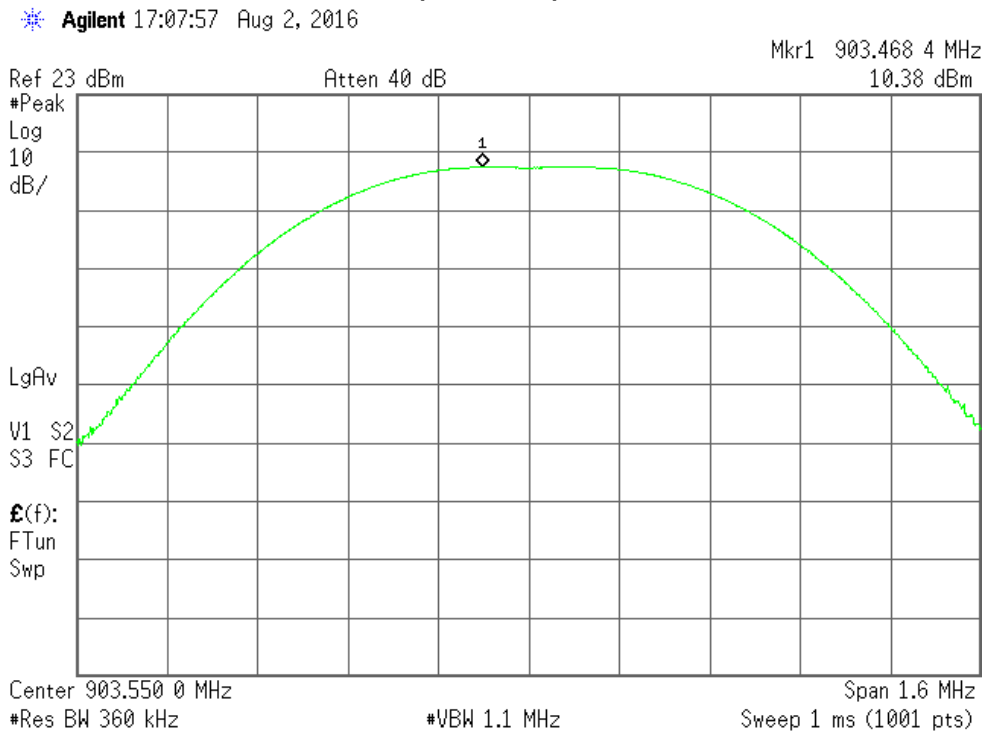
Antenna Height	NA	Turntable Rotation	NA
Equipment Class	NA	Measurement Distance	NA

TEST EQUIPMENT

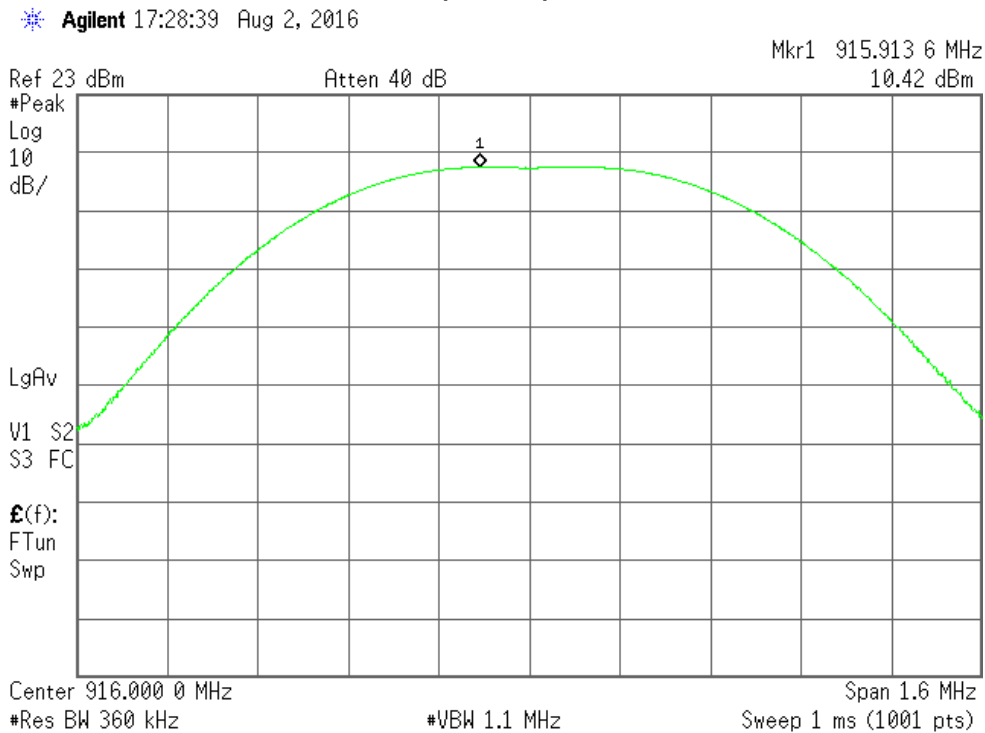
Y/N	Equipment	Make	Model	Serial Number	Cal Due Date
Y	Spectrum Analyzer	Agilent	E4440A	MY41000078	2017-05-18
Y	RF Cable	Digikey	1	NA	NA

TEST GRAPHS

Channel 1 (903.55 MHz) – Antenna 1



Channel 28 (916 MHz) – Antenna 1



Channel 55 (926.45 MHz) – Antenna 1

Agilent 17:17:07 Aug 2, 2016

Mkr1 926.362 0 MHz
10.41 dBm

Ref 23 dBm

Atten 40 dB

#Peak

Log

10

dB/

LgAv

V1 S2

S3 FC

E(f):

FTun

Swp

Center 926.450 0 MHz

#Res BW 360 kHz

#VBW 1.1 MHz

Span 1.6 MHz

Sweep 1 ms (1001 pts)

Channel 1 (903.55 MHz) – Antenna 2

Agilent 13:19:52 Aug 3, 2016

Mkr1 903.462 2 MHz
10.35 dBm

Ref 23 dBm

Atten 40 dB

#Peak

Log

10

dB/

LgAv

V1 S2

S3 FC

E(f):

FTun

Swp

Center 903.550 0 MHz

#Res BW 360 kHz

VBW 1.1 MHz

Span 1.6 MHz

Sweep 1.066 ms (4000 pts)

Channel 28 (916 MHz) – Antenna 2

Agilent 13:29:55 Aug 3, 2016

Mkr1 915.916 6 MHz
10.39 dBm

Ref 23 dBm

Atten 40 dB

#Peak
Log
10
dB/

LgAv

V1 S2
S3 FC $\mathcal{E}(f)$:
FTun
Swp

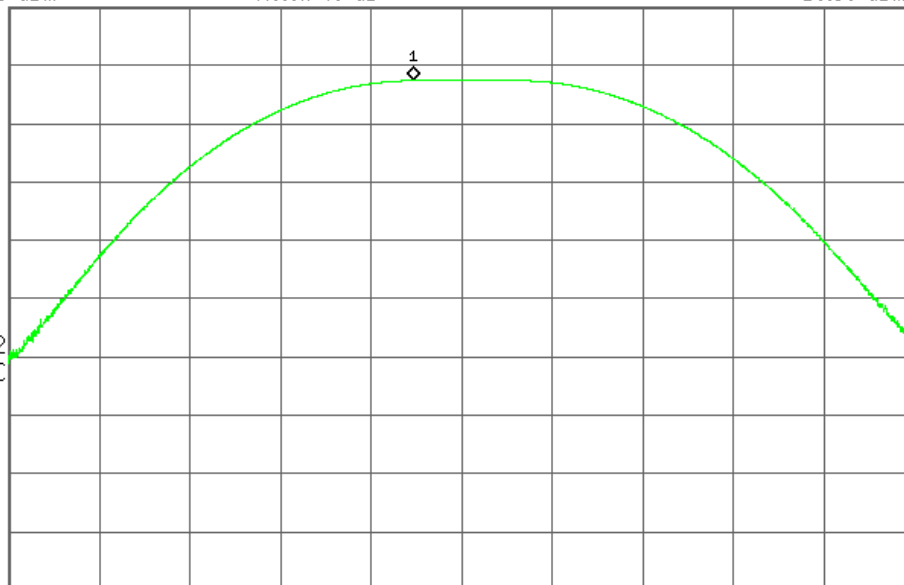
Center 916.000 0 MHz

#Res BW 360 kHz

VBW 1.1 MHz

Span 1.6 MHz

Sweep 1.066 ms (4000 pts)



Channel 55 (926.45 MHz) – Antenna 2

Agilent 13:24:49 Aug 3, 2016

Mkr1 926.357 4 MHz
10.42 dBm

Ref 23 dBm

Atten 40 dB

#Peak
Log
10
dB/

LgAv

V1 S2
S3 FC $\mathcal{E}(f)$:
FTun
Swp

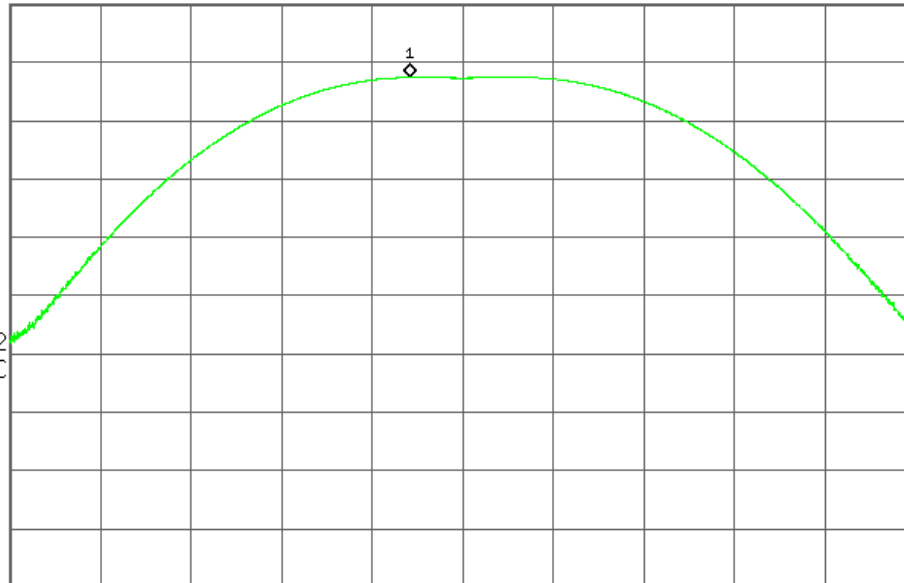
Center 926.450 0 MHz

#Res BW 360 kHz

VBW 1.1 MHz

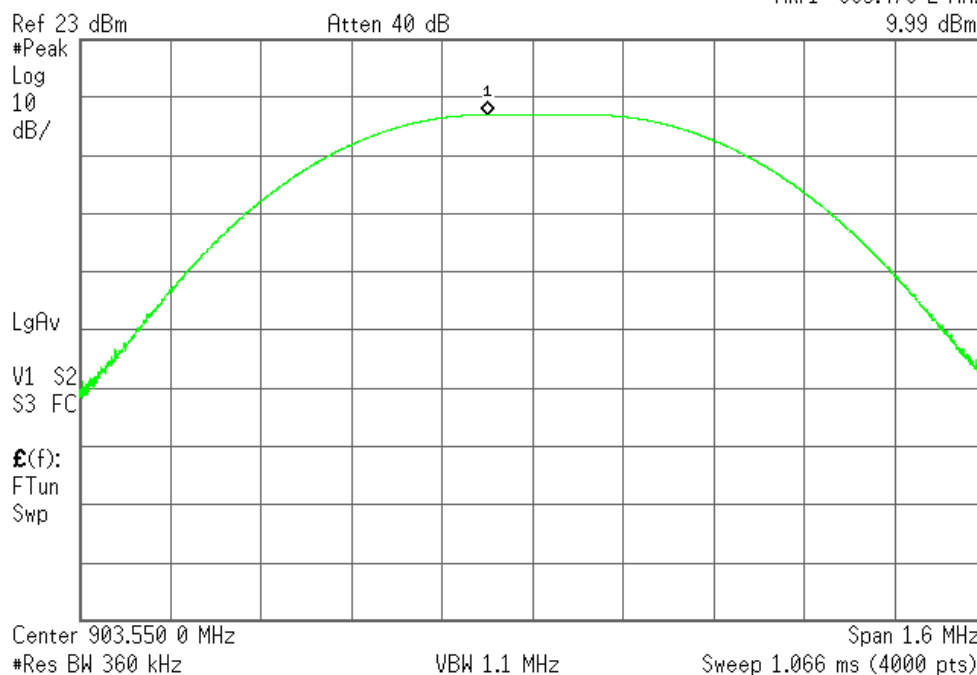
Span 1.6 MHz

Sweep 1.066 ms (4000 pts)



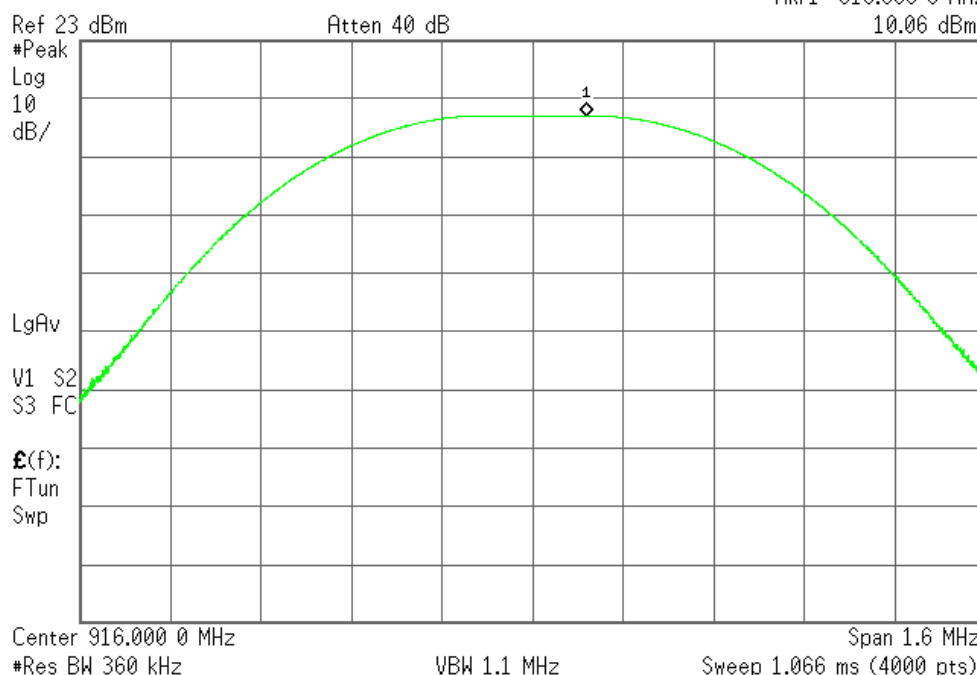
Channel 1 (903.55 MHz) – Antenna 3

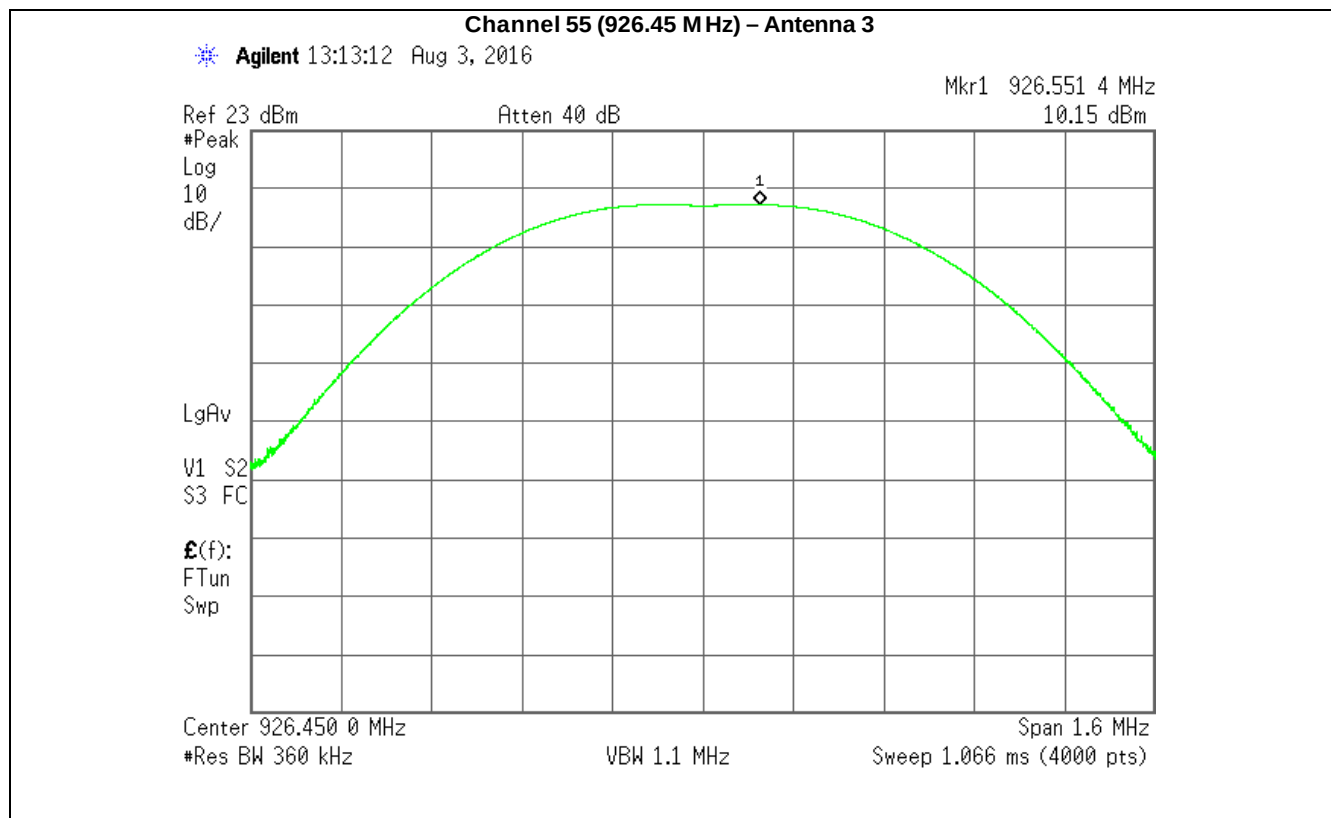
Agilent 13:07:10 Aug 3, 2016

Mkr1 903.470 2 MHz
9.99 dBm

Channel 28 (916 MHz) – Antenna 3

Agilent 12:59:10 Aug 3, 2016

Mkr1 916.096 6 MHz
10.06 dBm



TEST RESULT

Antenna	Channel	Frequency	Measured Power Level	Cable Loss + Attenuator	Transmitter Power Level	Limit	Result
#	#	MHz	dBm	dB	dBm	dBm	
1	1	903.55	10.38	6.5	16.98	≤23.979	PASS
1	28	916	10.42	6.5	17.02	≤23.979	PASS
1	55	926.45	10.41	6.5	17.01	≤23.979	PASS
2	1	903.55	10.35	6.5	16.95	≤23.979	PASS
2	28	916	10.39	6.5	16.99	≤23.979	PASS
2	55	926.45	10.42	6.5	16.92	≤23.979	PASS
3	1	903.55	9.99	6.5	16.49	≤23.979	PASS
3	28	916	10.06	6.5	16.56	≤23.979	PASS
3	55	926.45	10.15	6.5	16.65	≤23.979	PASS

Note: Transmitter Output Power = Measured Level (dBm) + Cable Loss (dB)+Attenuator (dB)

TEST SETUP PHOTOGRAPHS

Refer Annexure -1

2.3 CARRIER FREQUENCY SEPARATION

EUT Nomenclature	Wireless Smoke Detector	Test Request No.	20295-1
Model No.	FWD-200ACCLIMATE	Serial No.	MEL-150
Test Start Date	2017-04-20	Temperature (°C)	23.6°C
Test End Date	2017-04-24	Humidity RH (%)	51.9%RH
Tested By	Chris Locke	Pressure (mbar)	NR
Input Voltage / Freq.	3.3 Vdc		
Operating Mode	Refer Page 5 for Operating Mode Table		
Test configuration	Refer Page 5 for Test Configuration Table		
Deviation from Std.	NA		
Applicable standard	FCC Part 15.247:2010		
Test Method	DA 00-705		
Comment	NA		

TEST DETAILS

Method	Radiated ☐	Conducted ☒
--------	-----------------------------------	---

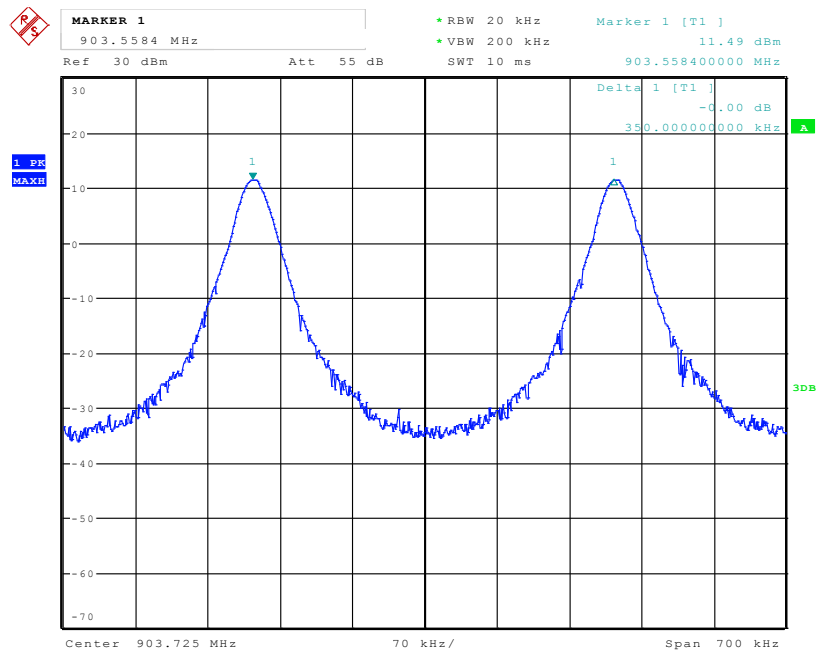
TEST PARAMETERS

Antenna Height	NA	Turntable Rotation	NA
Equipment Class	NA	Measurement Distance	NA

TEST EQUIPMENT

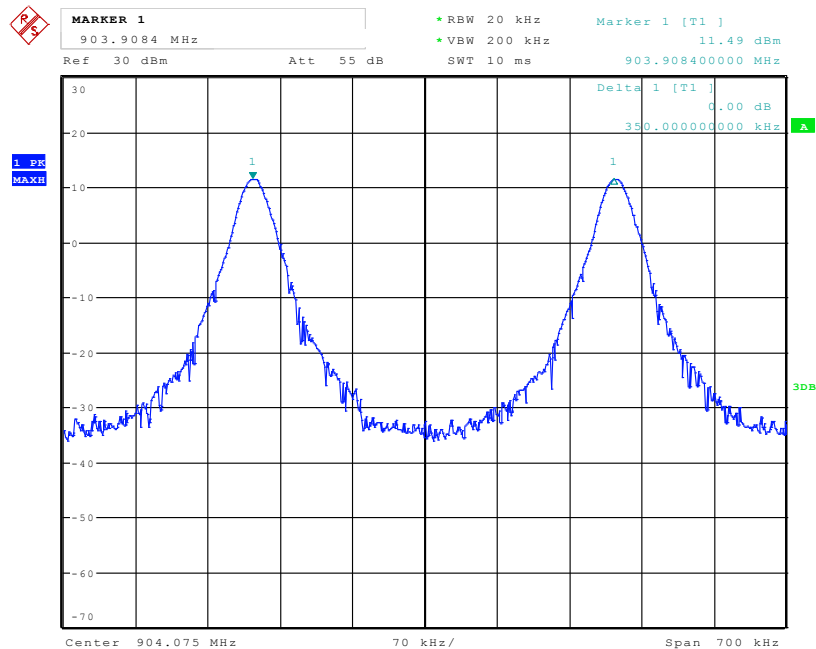
Y/N	Equipment	Make	Model	Serial Number	Cal Due Date
Y	Spectrum Analyzer	Rohde & Schwarz	FSU26	100303	2018-04-10
Y	RF Cable	Digikey	1	NA	NA

TEST GRAPHS



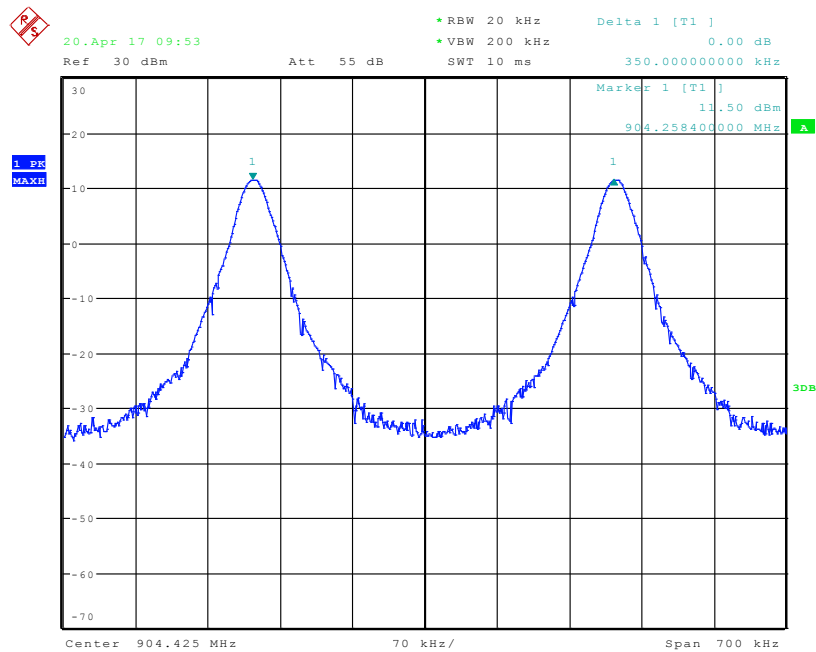
Date: 20.APR.2017 09:31:31

Channel 1 and 2 (Walkie Talkie)



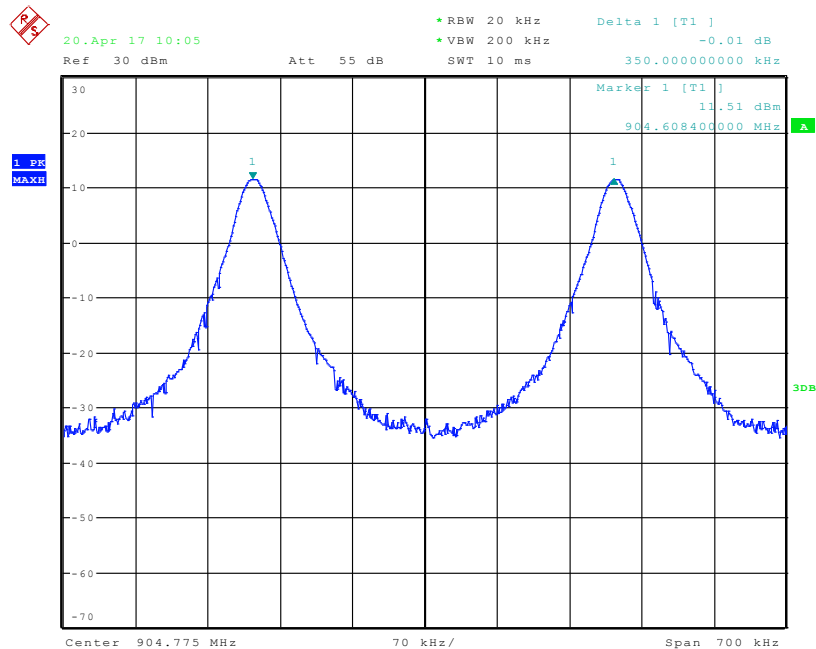
Date: 20.APR.2017 09:43:11

Channel 2 and 3 (Walkie Talkie)



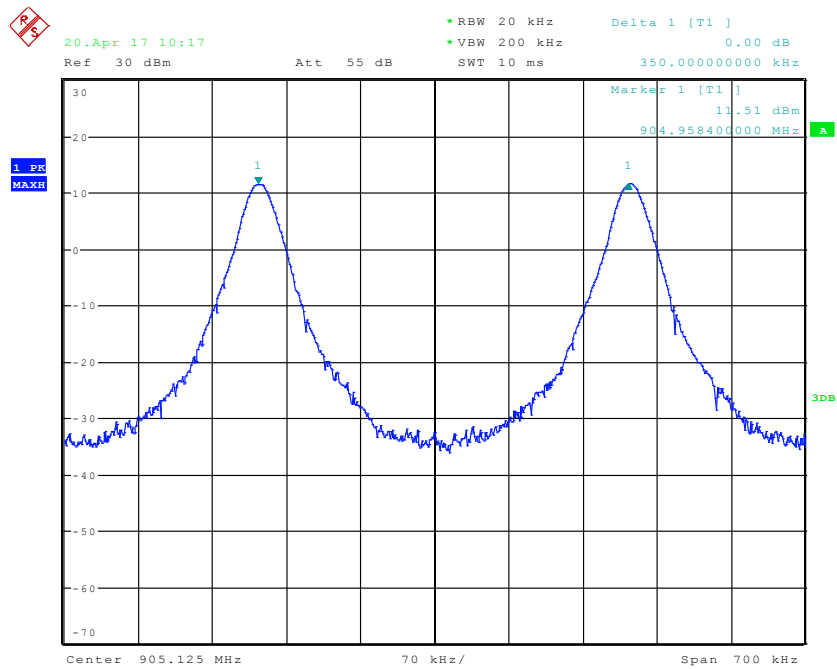
Date: 20.APR.2017 09:53:17

Channel 3 and 4 (Walkie Talkie)



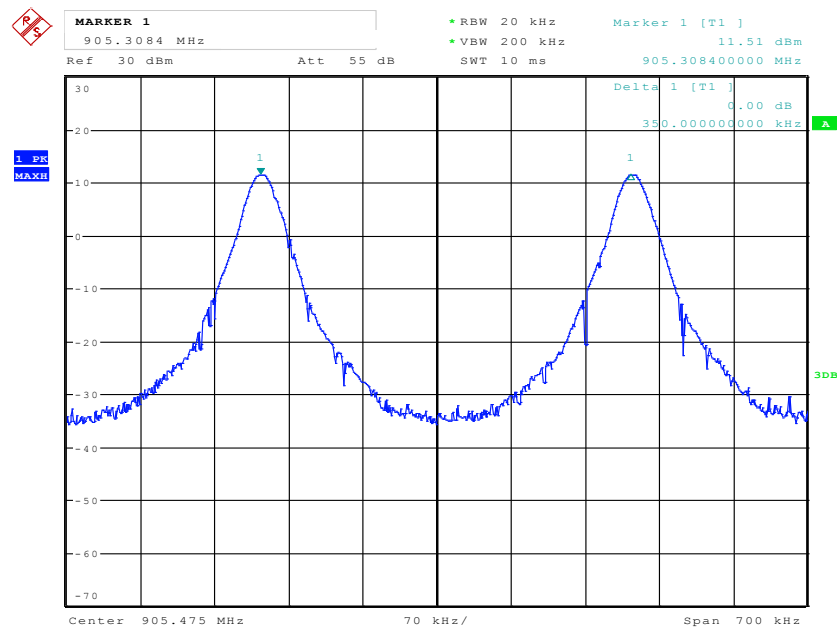
Date: 20.APR.2017 10:05:37

Channel 4 to 5 (Walkie Talkie)



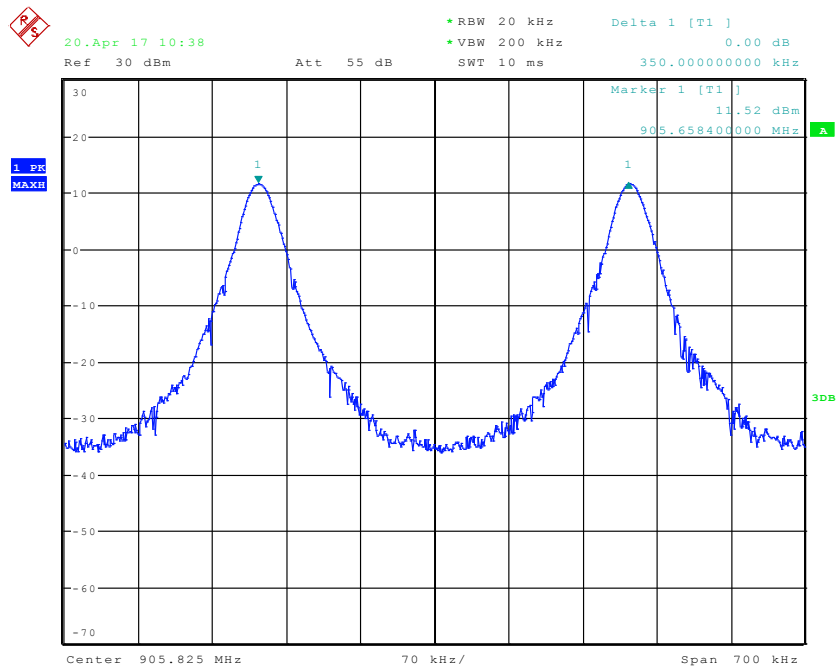
Date: 20.APR.2017 10:17:54

Channel 5 to 6 (Walkie Talkie)



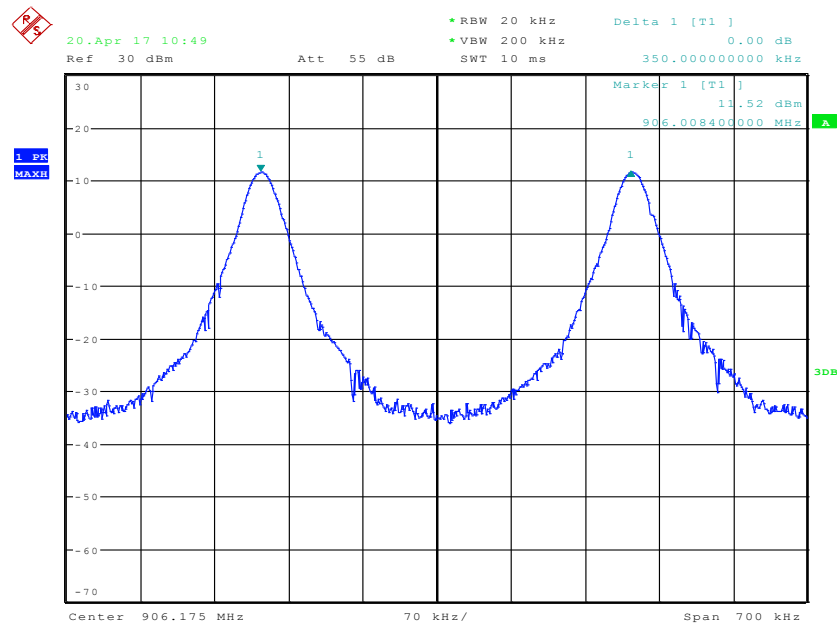
Date: 20.APR.2017 10:29:54

Channel 6 to 7 (Walkie Talkie)



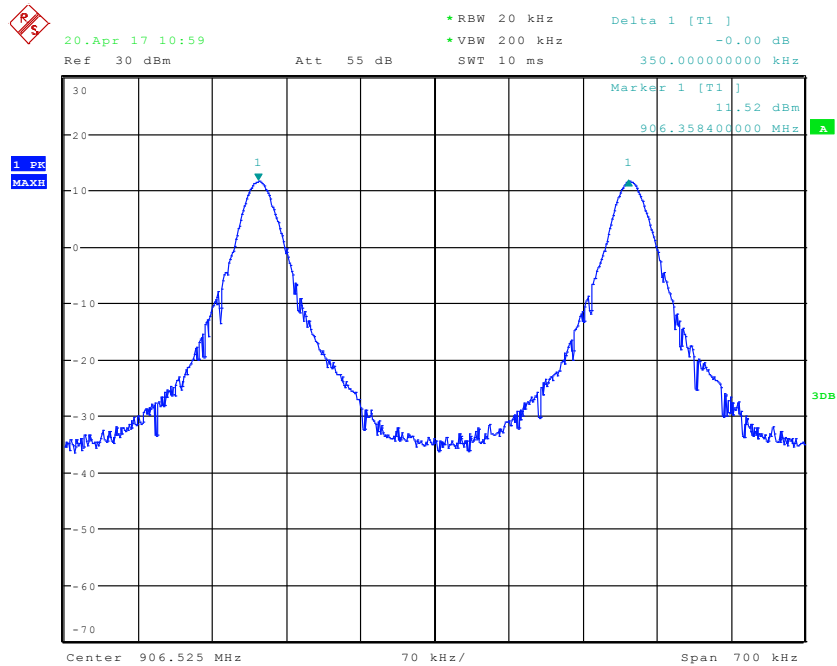
Date: 20.APR.2017 10:38:16

Channel 7 to 8 (Walkie Talkie)



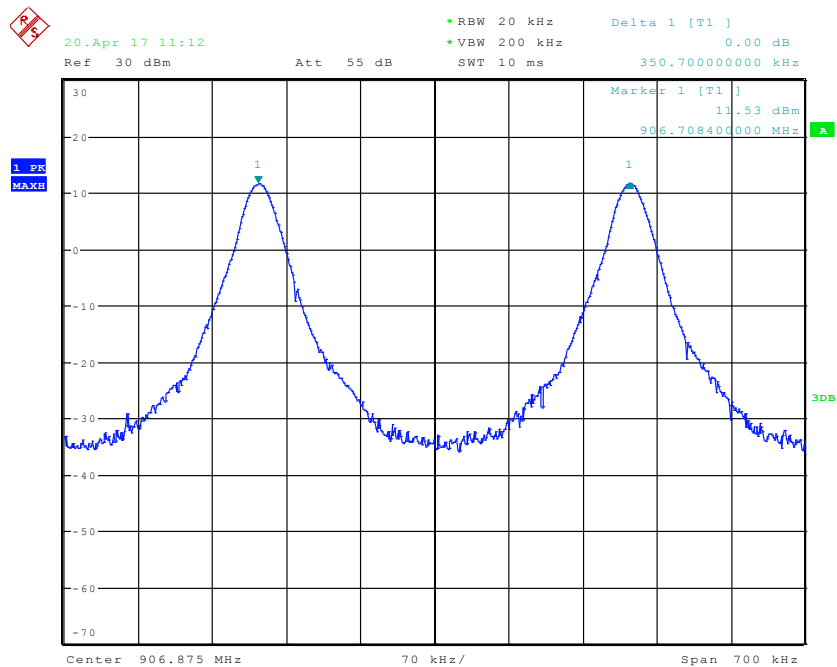
Date: 20.APR.2017 10:49:57

Channel 8 to 9 (Walkie Talkie)



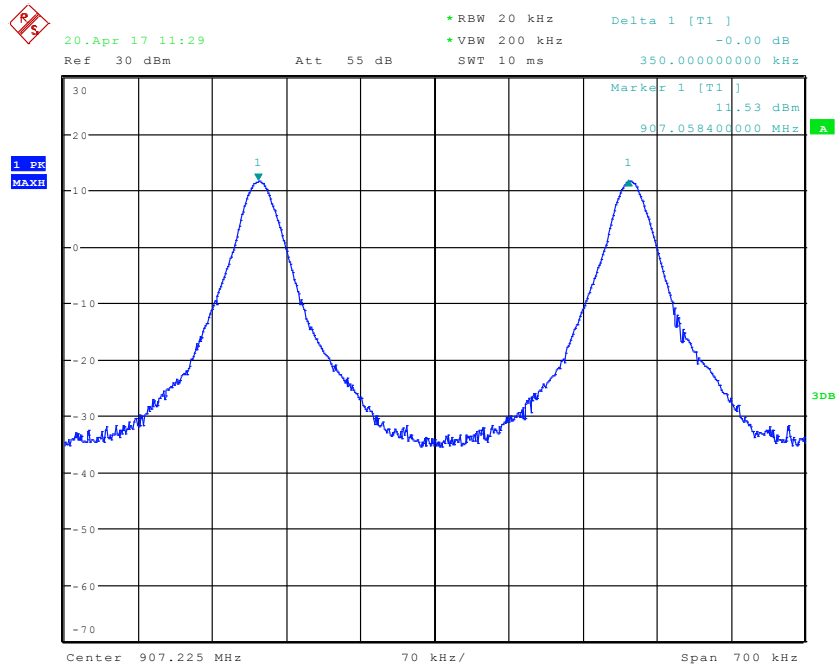
Date: 20.APR.2017 10:59:05

Channel 9 to 10 (Walkie Talkie)



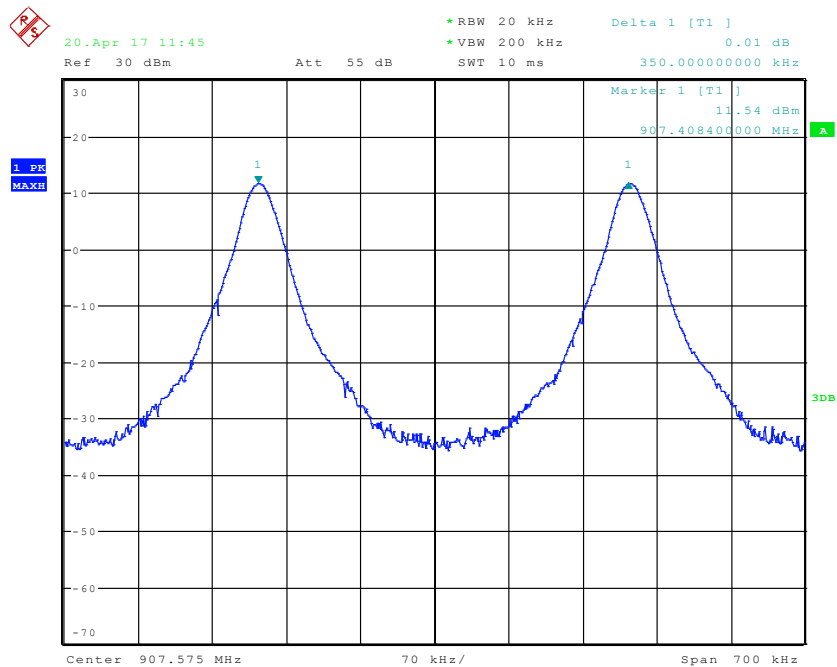
Date: 20.APR.2017 11:12:22

Channel 10 to 11 (Walkie Talkie)



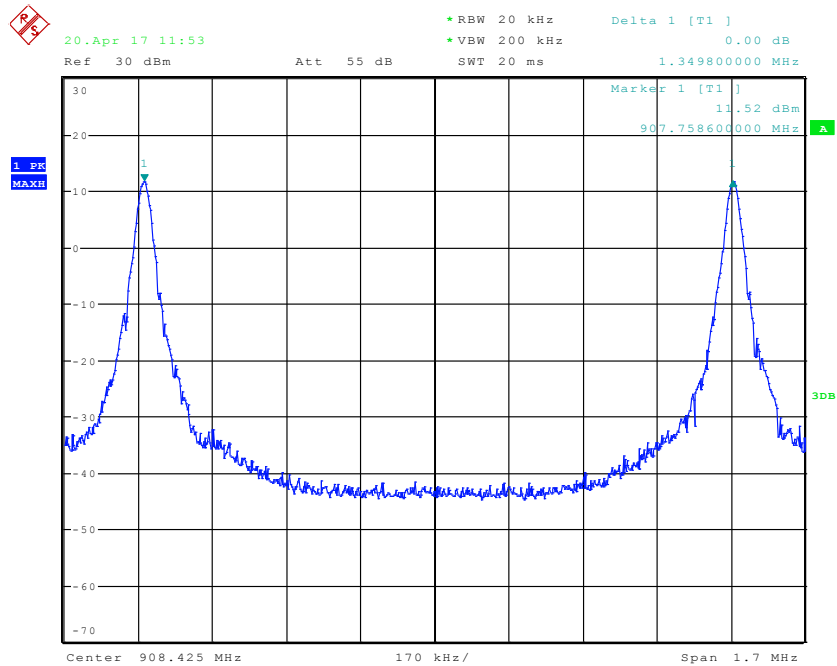
Date: 20.APR.2017 11:29:12

Channel 11 to 12 (Walkie Talkie)



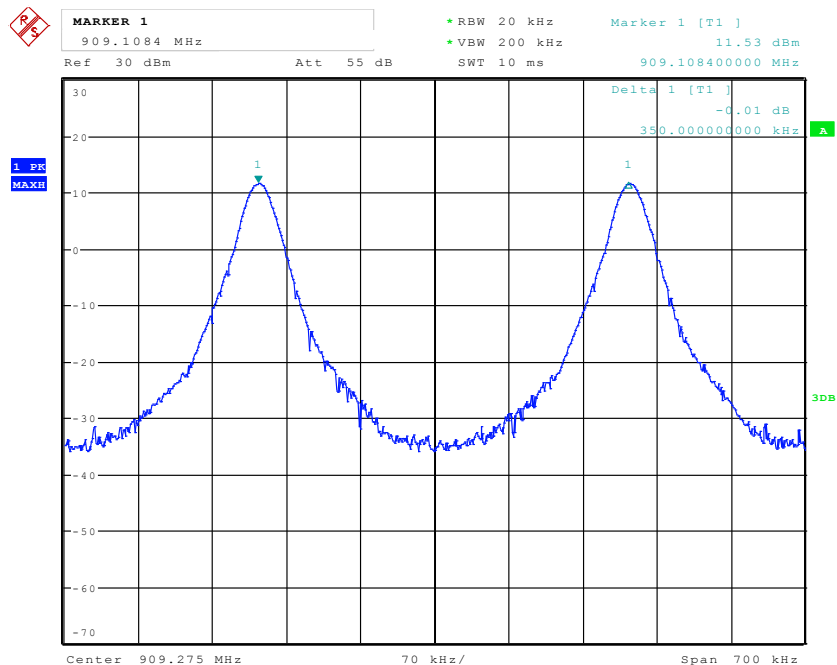
Date: 20.APR.2017 11:45:31

Channel 12 to 13 (Walkie Talkie)



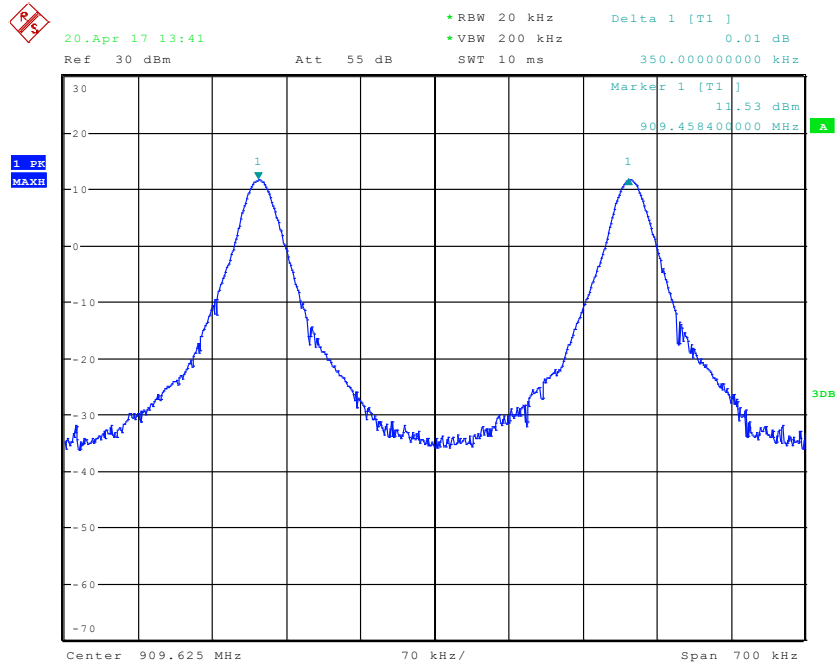
Date: 20.APR.2017 11:53:58

Channel 13 to 14 (Walkie Talkie)



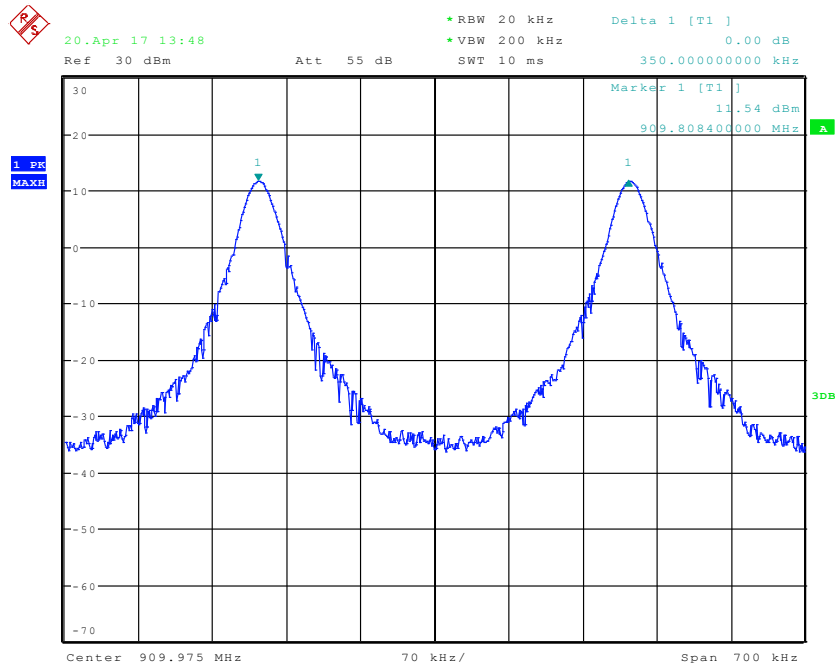
Date: 20.APR.2017 13:29:52

Channel 1 to 2 (Normal)



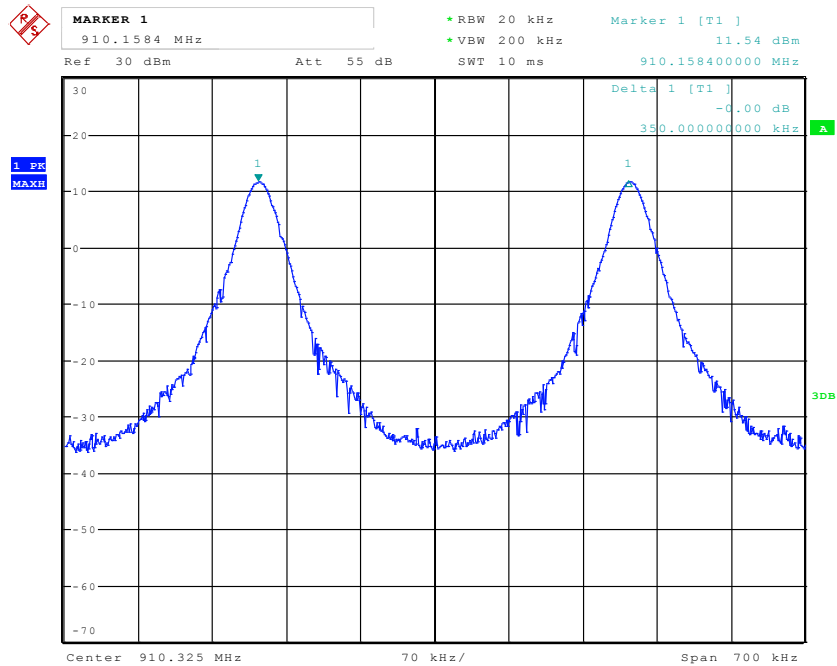
Date: 20.APR.2017 13:41:50

Channel 2 to 3 (Normal)



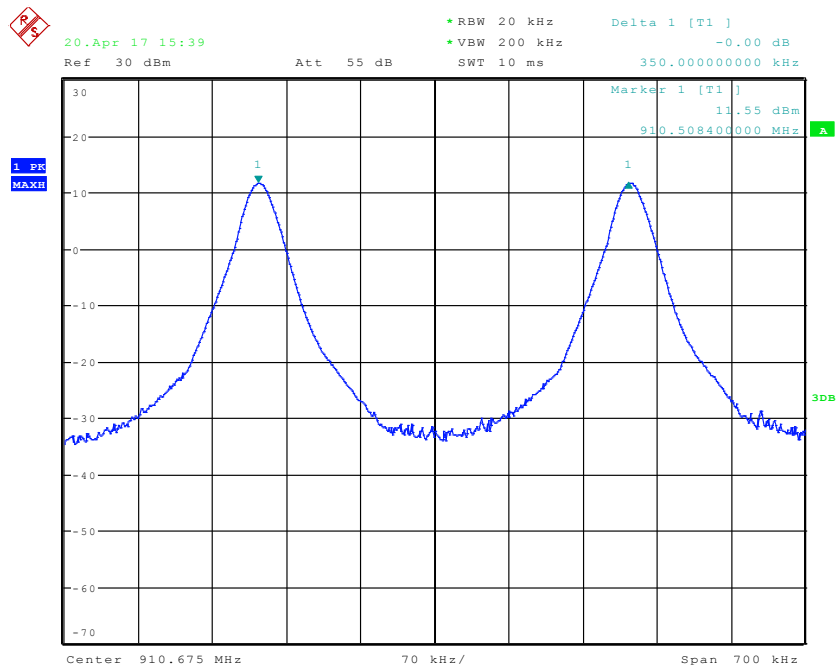
Date: 20.APR.2017 13:48:50

Channel 3 to 4 (Normal)



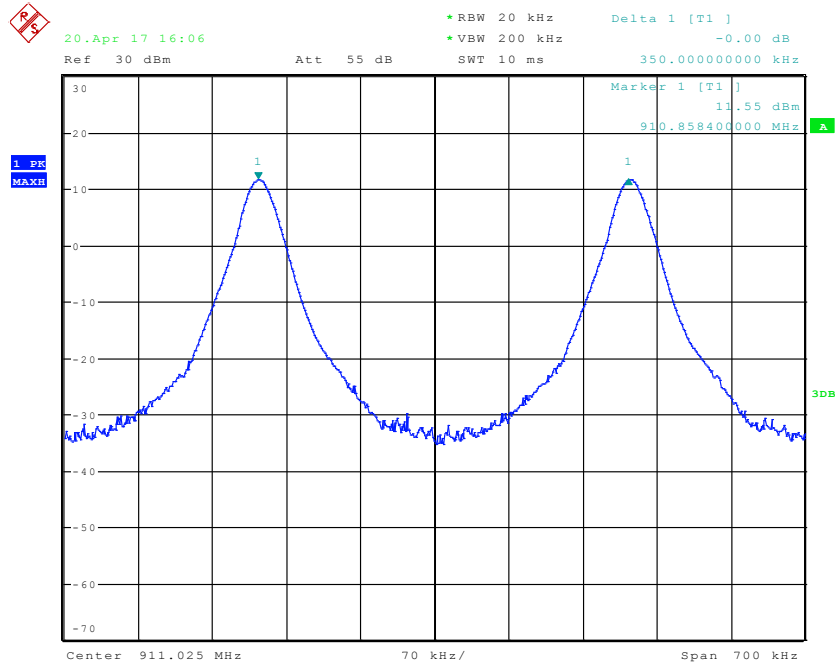
Date: 20.APR.2017 13:56:36

Channel 4 to 5 (Normal)



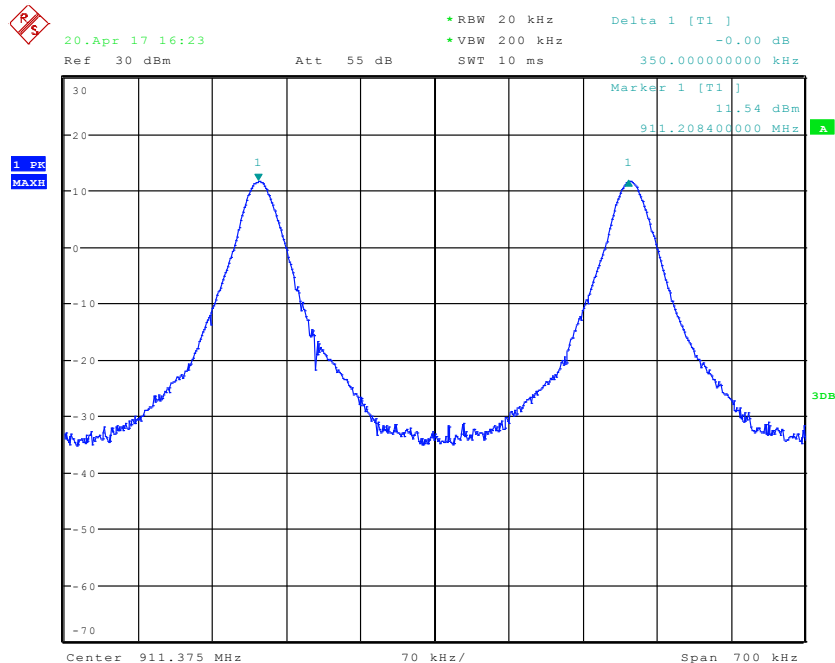
Date: 20.APR.2017 15:39:07

Channel 5 to 6 (Normal)



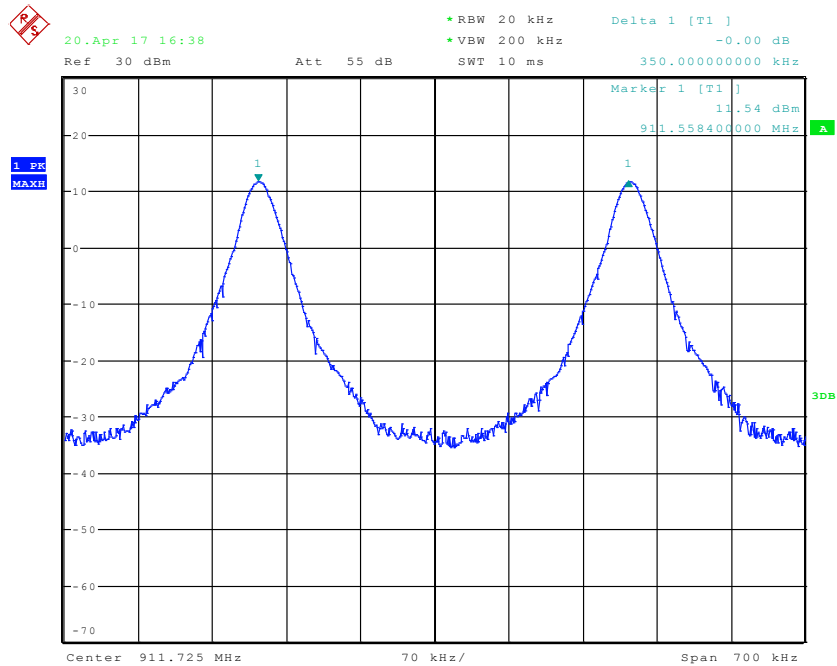
Date: 20.APR.2017 16:07:01

Channel 6 to 7 (Normal)



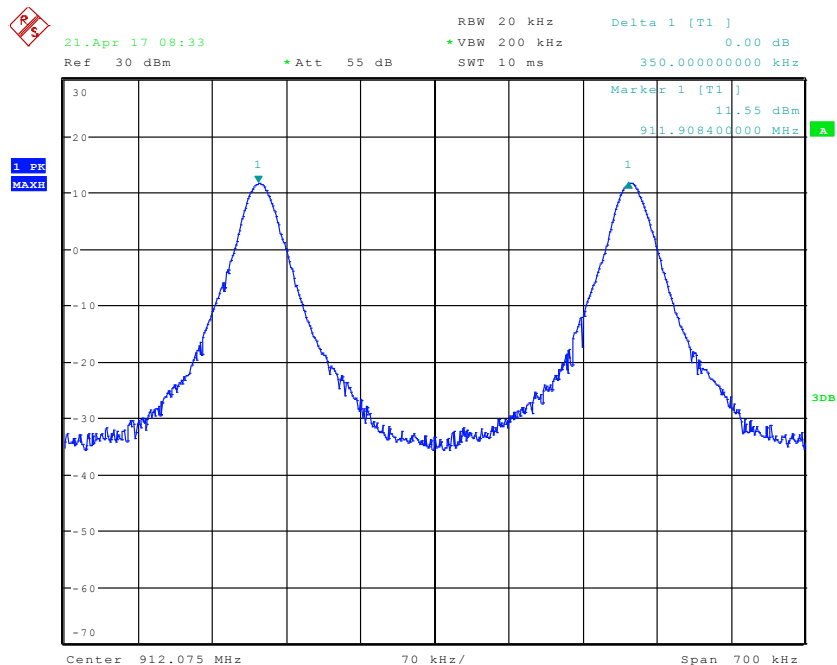
Date: 20.APR.2017 16:23:55

Channel 7 to 8 (Normal)



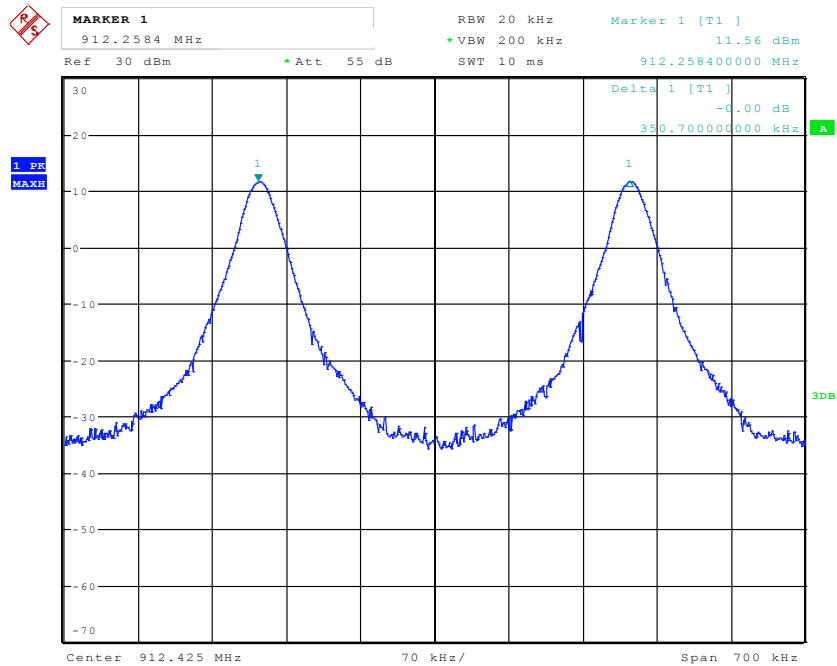
Date: 20.APR.2017 16:38:05

Channel 8 to 9 (Normal)



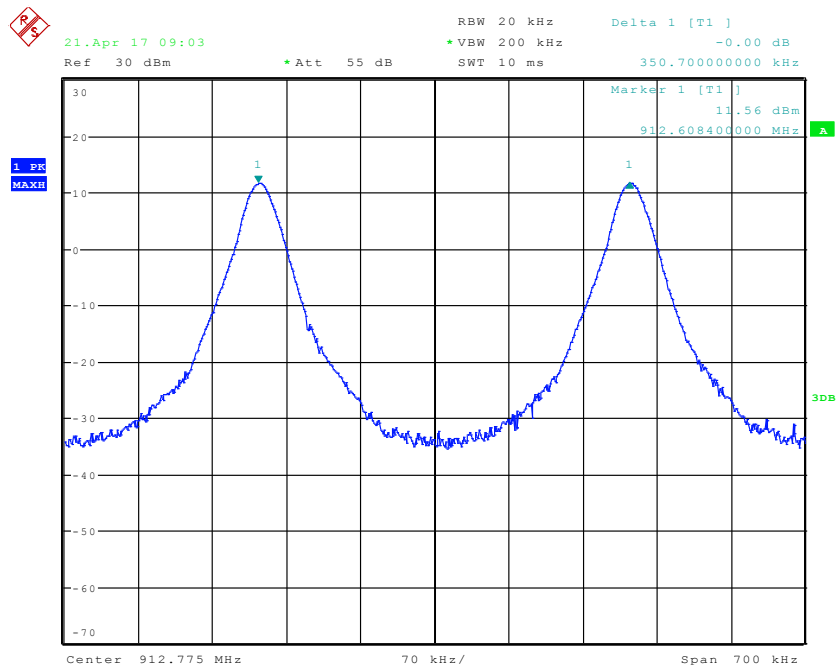
Date: 21.APR.2017 08:33:09

Channel 9 to 10 (Normal)



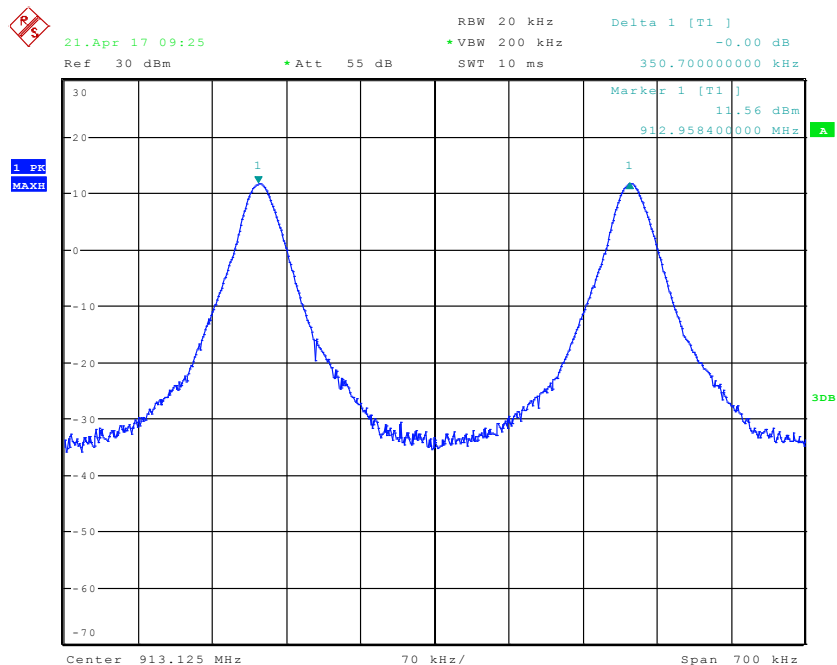
Date: 21.APR.2017 08:45:32

Channel 10 to 11 (Normal)



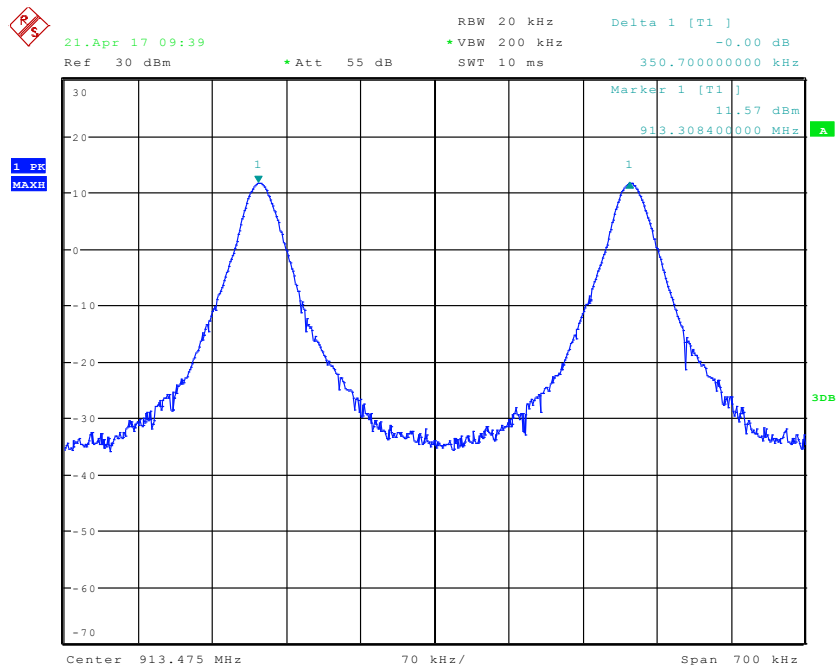
Date: 21.APR.2017 09:04:00

Channel 11 to 12 (Normal)



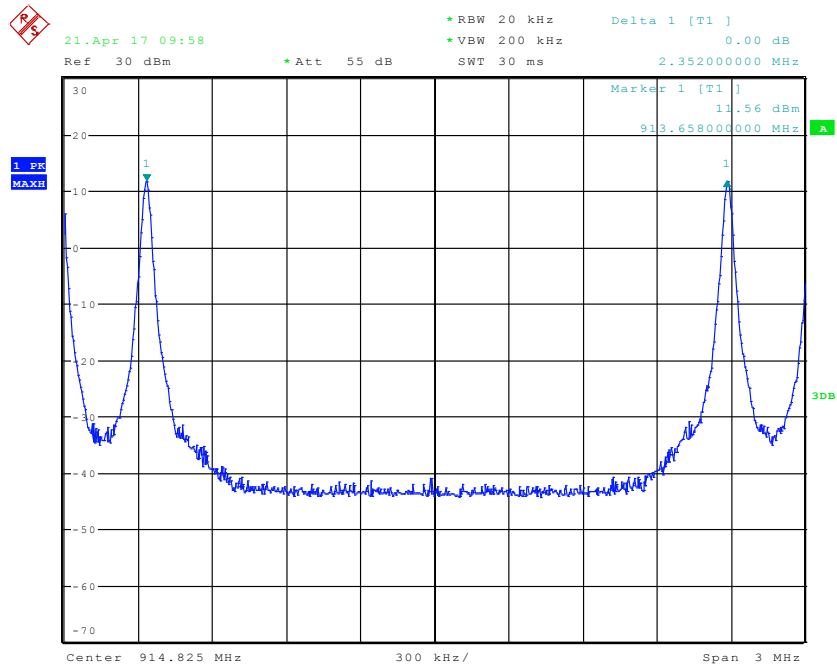
Date: 21.APR.2017 09:25:06

Channel 12 to 13 (Normal)



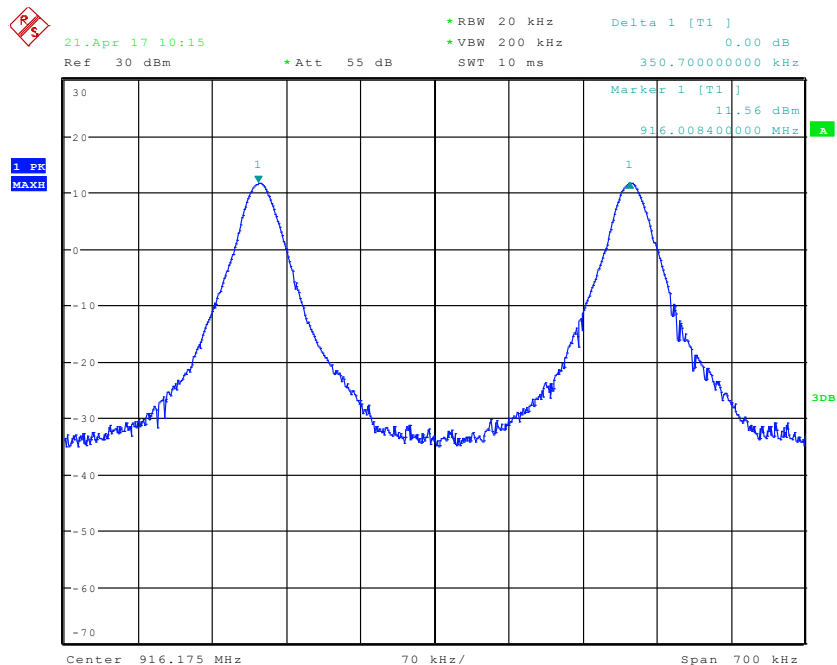
Date: 21.APR.2017 09:39:16

Channel 13 to 14 (Normal)



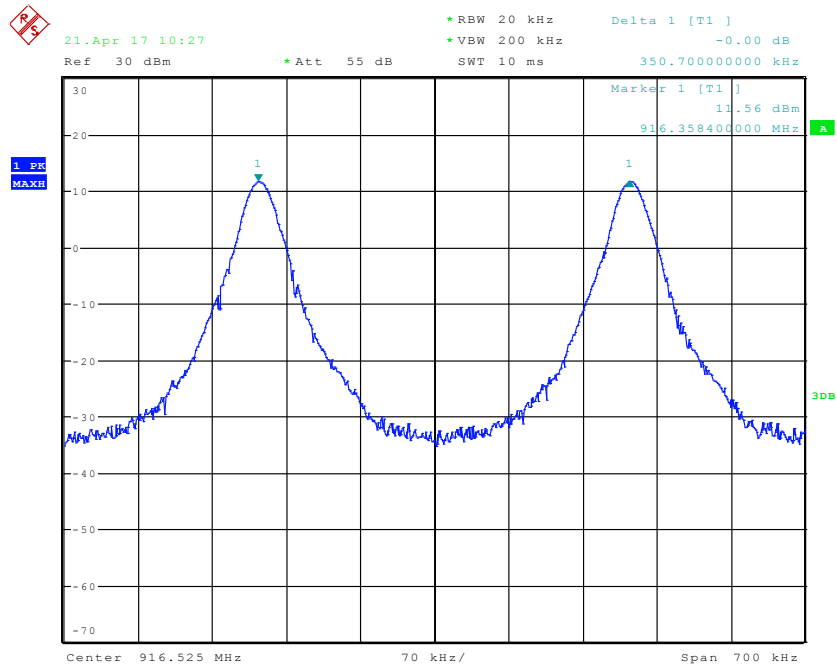
Date: 21.APR.2017 09:58:46

Channel 14 to 15 (Normal)



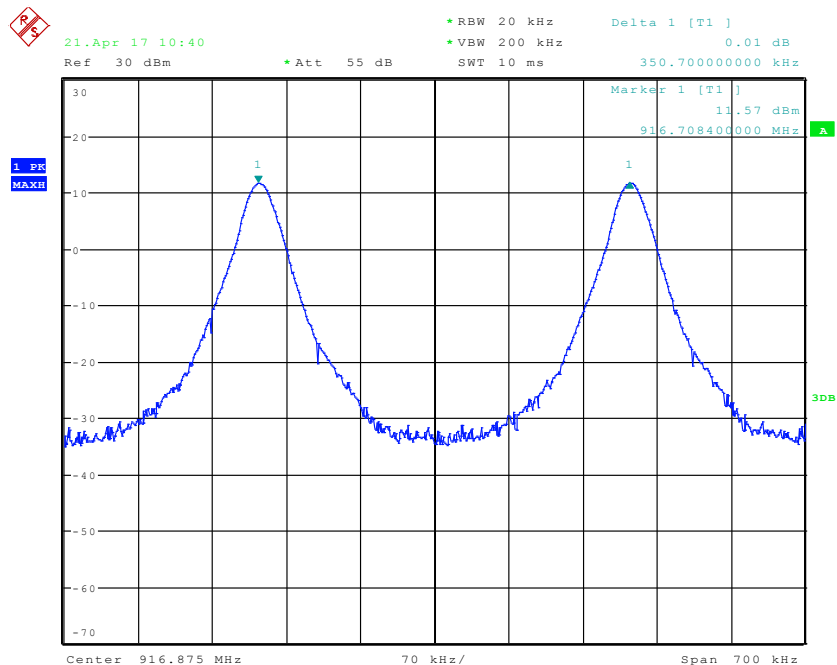
Date: 21.APR.2017 10:15:54

Channel 15 to 16 (Normal)



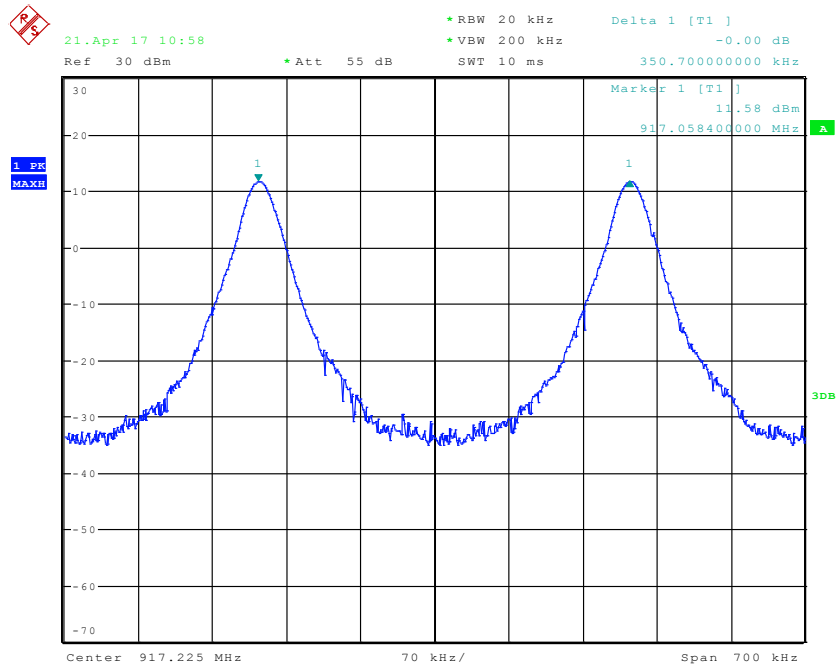
Date: 21.APR.2017 10:27:39

Channel 16 to 17 (Normal)



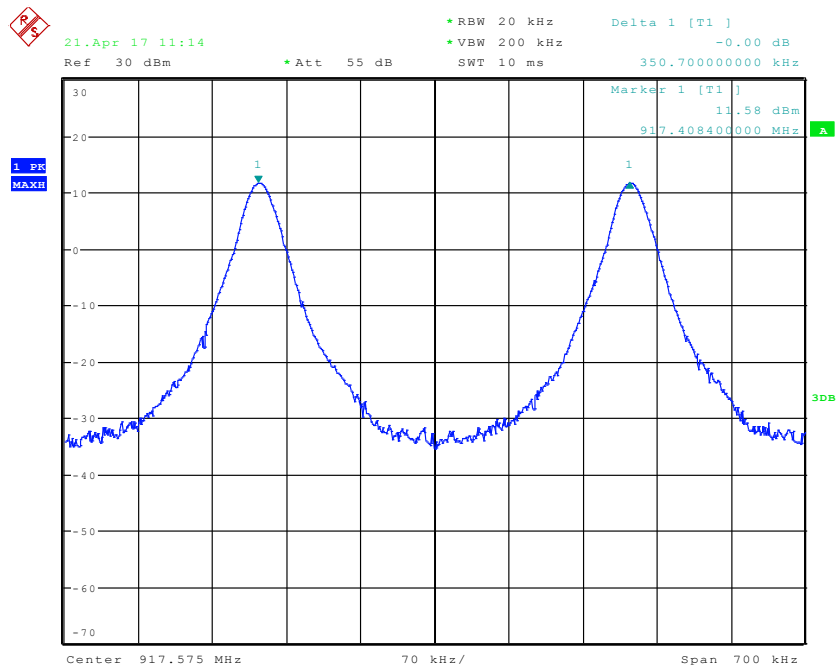
Date: 21.APR.2017 10:40:45

Channel 17 to 18 (Normal)



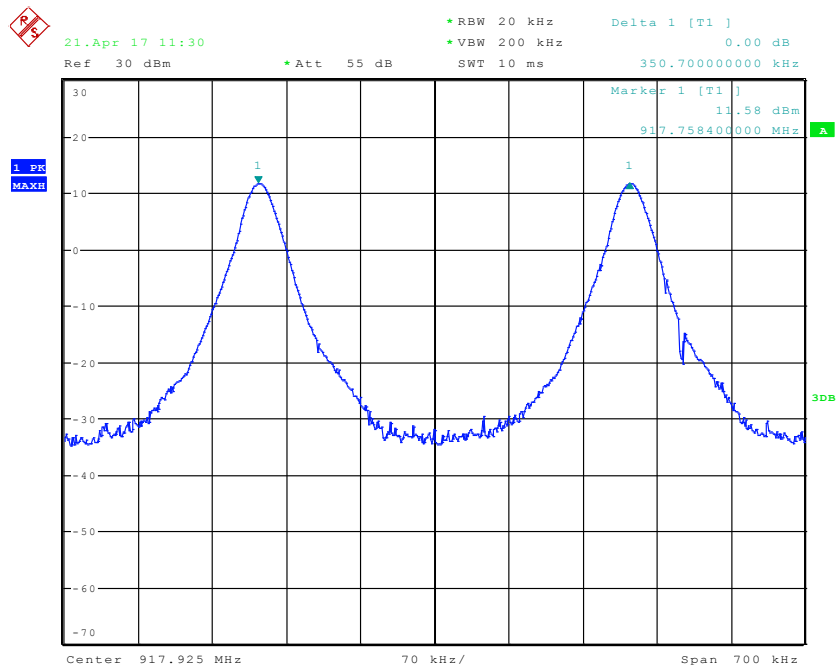
Date: 21.APR.2017 10:58:41

Channel 18 to 19 (Normal)



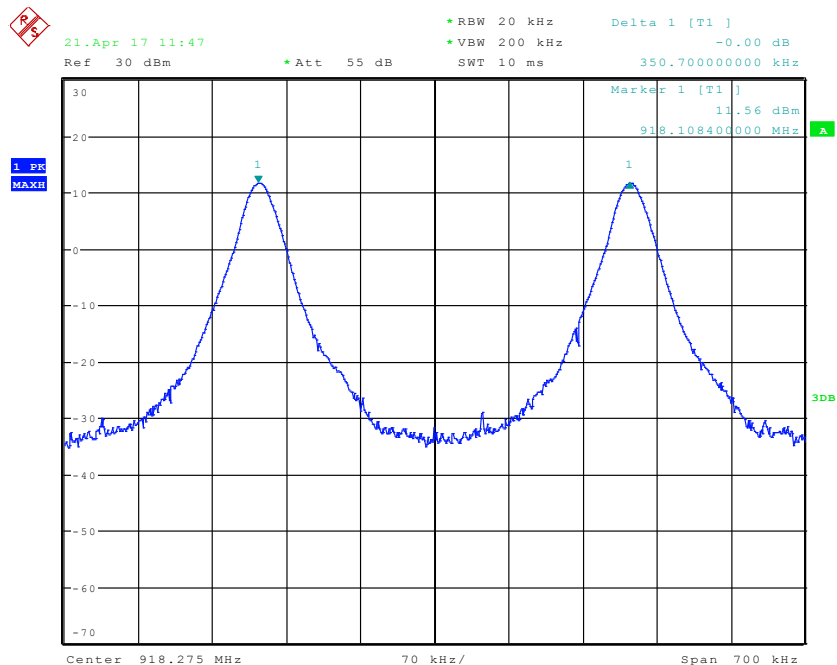
Date: 21.APR.2017 11:14:26

Channel 19 to 20 (Normal)



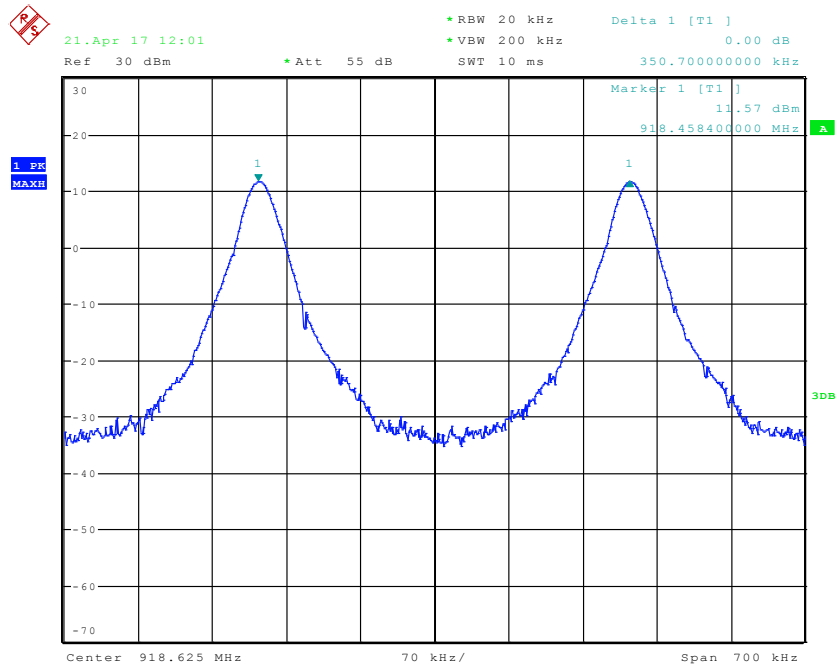
Date: 21.APR.2017 11:30:24

Channel 20 to 21 (Normal)



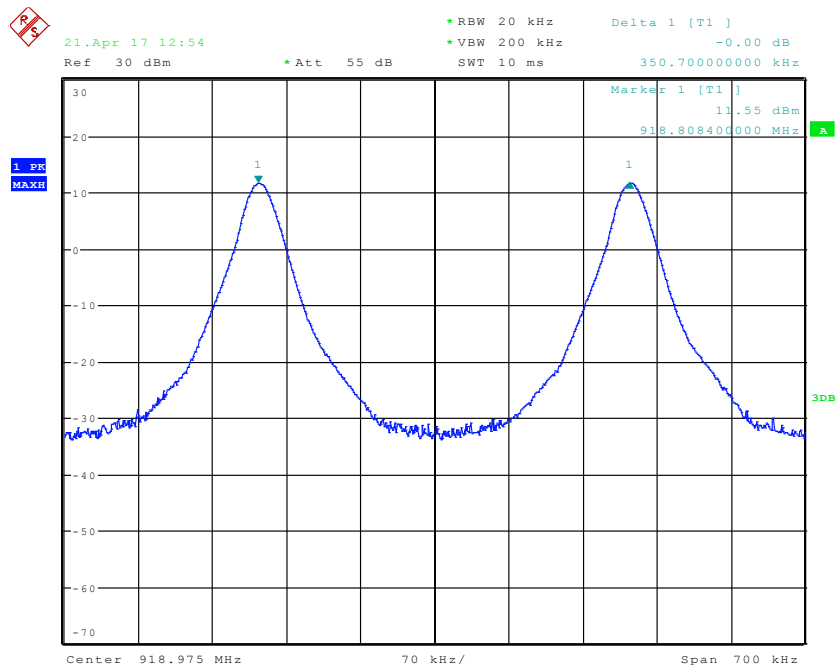
Date: 21.APR.2017 11:47:32

Channel 21 to 22 (Normal)



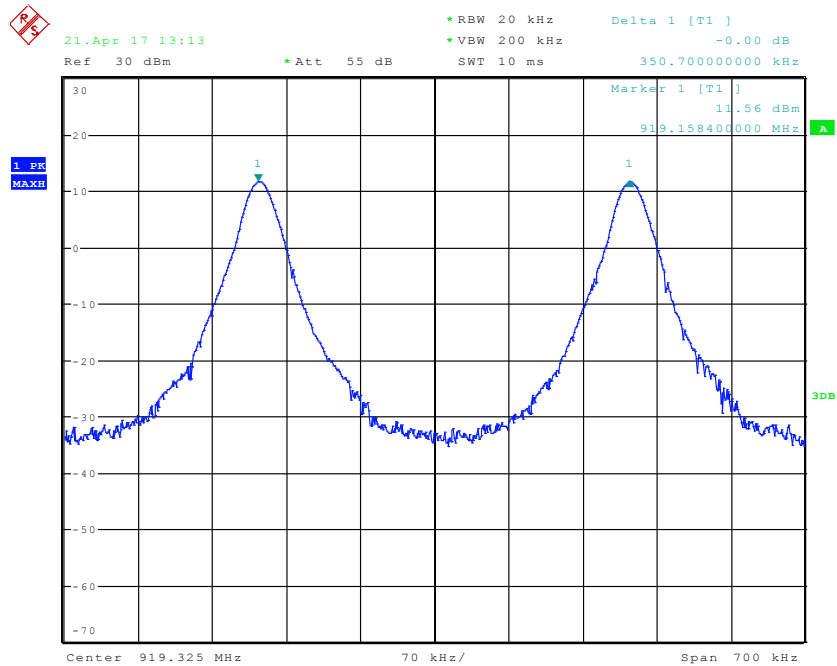
Date: 21.APR.2017 12:01:28

Channel 22 to 23 (Normal)



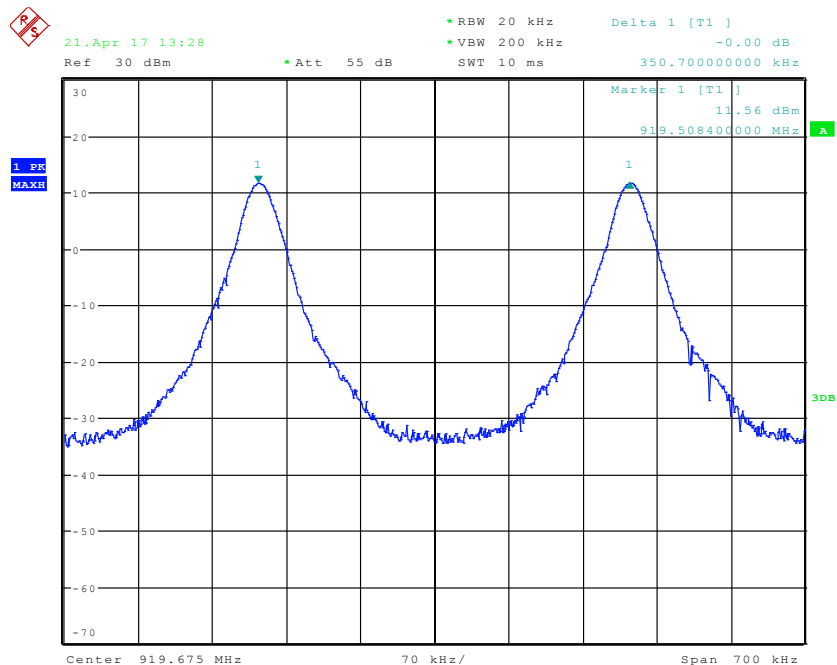
Date: 21.APR.2017 12:54:37

Channel 23 to 24 (Normal)



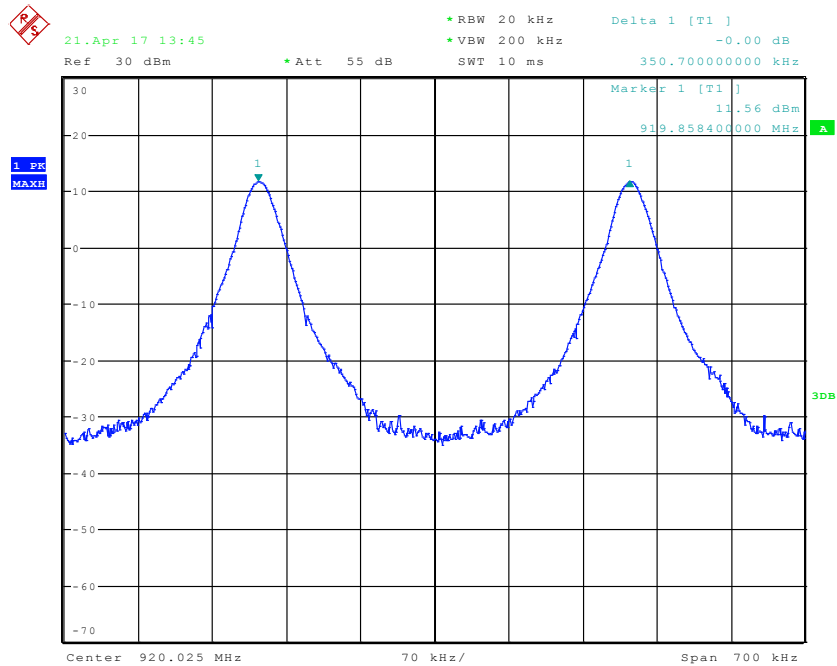
Date: 21.APR.2017 13:13:55

Channel 24 to 25 (Normal)



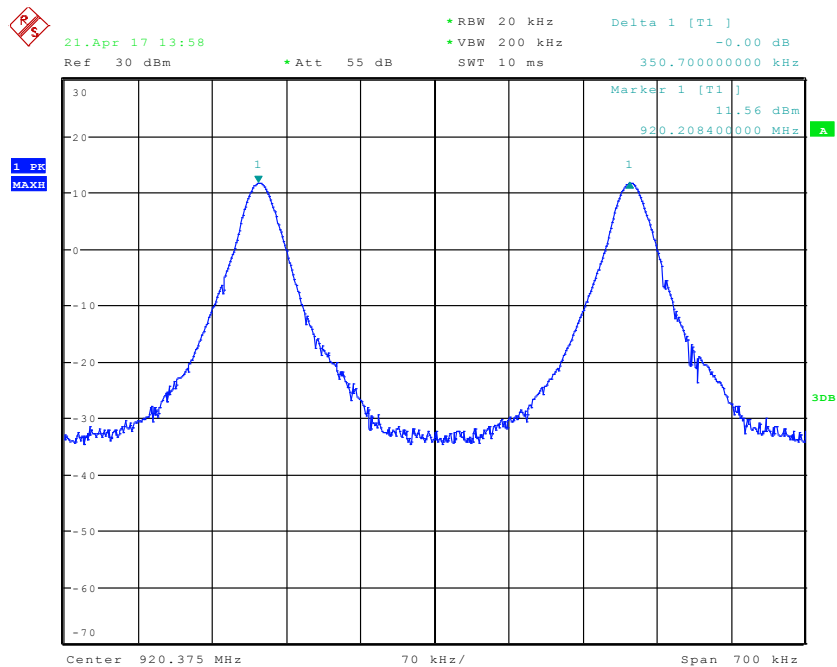
Date: 21.APR.2017 13:28:36

Channel 25 to 26 (Normal)



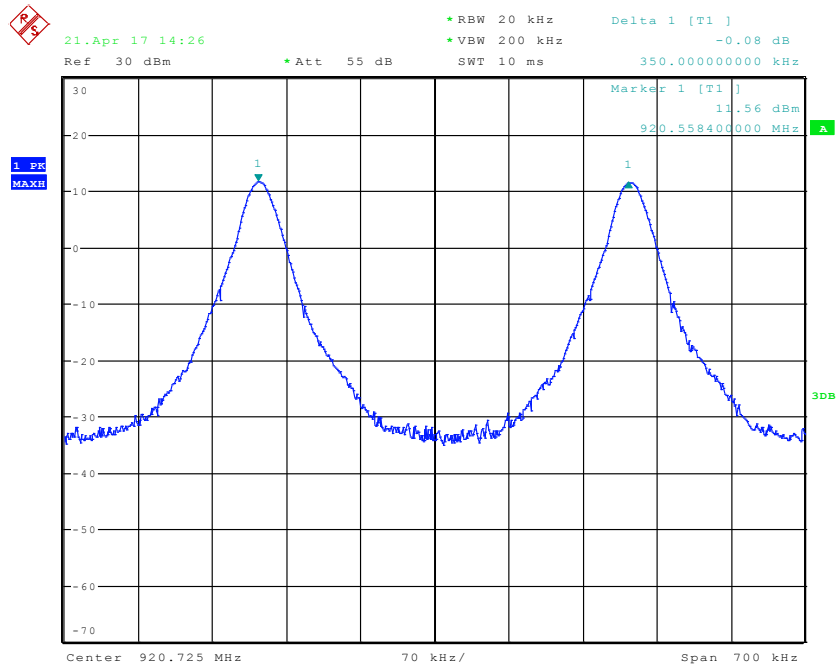
Date: 21.APR.2017 13:45:06

Channel 26 to 27 (Normal)



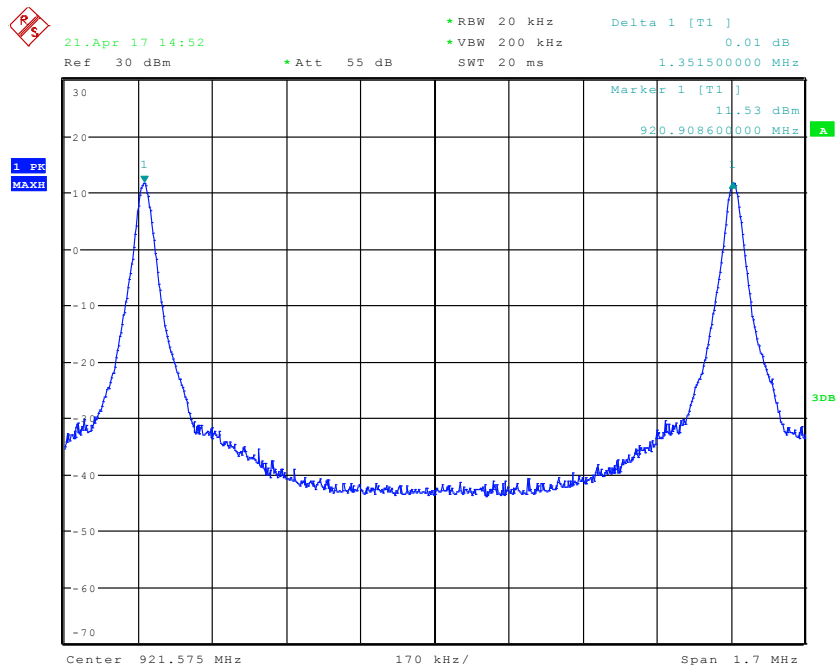
Date: 21.APR.2017 13:58:38

Channel 27 to 28 (Normal)



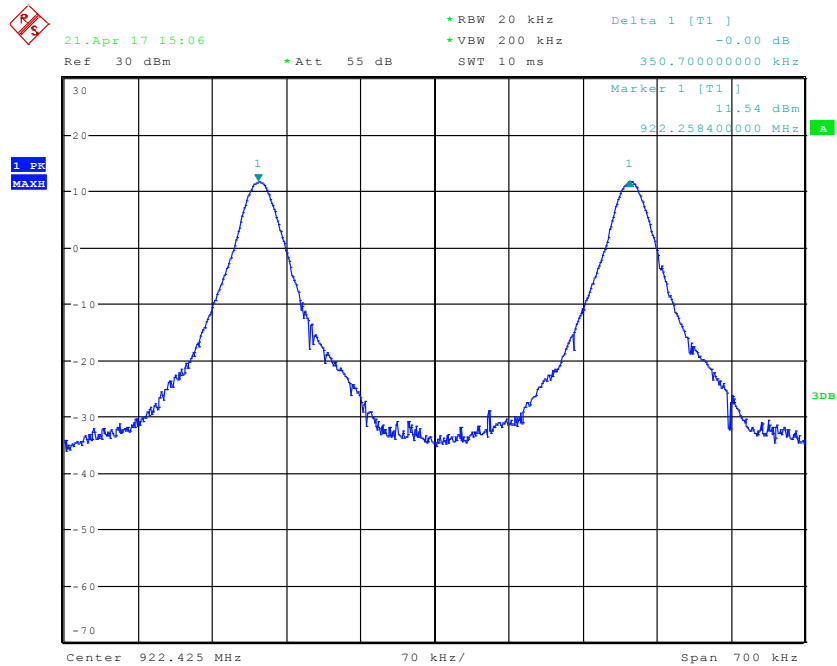
Date: 21.APR.2017 14:26:05

Channel 28 (Normal) to 15 (Walkie Talkie)



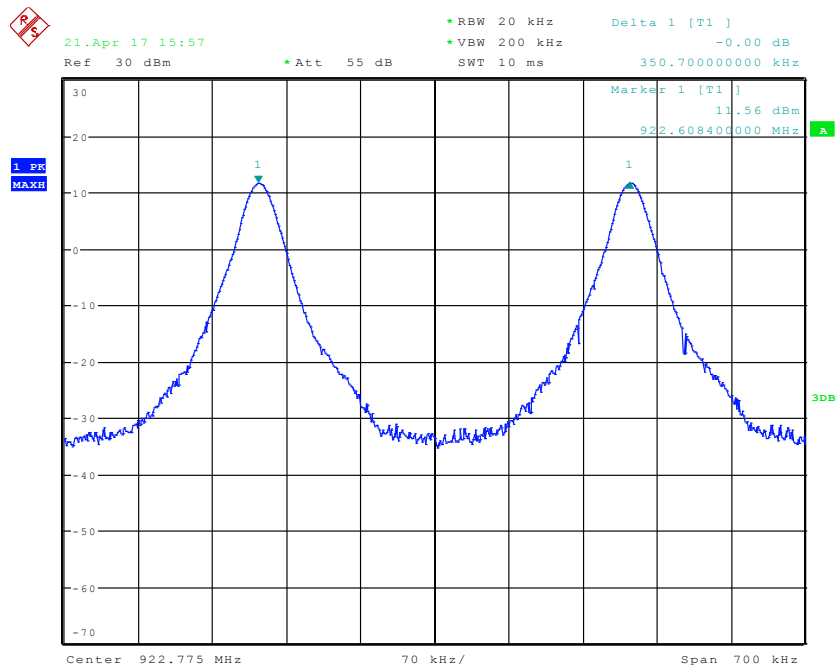
Date: 21.APR.2017 14:52:22

Channel 15 to 16 (Walkie Talkie)



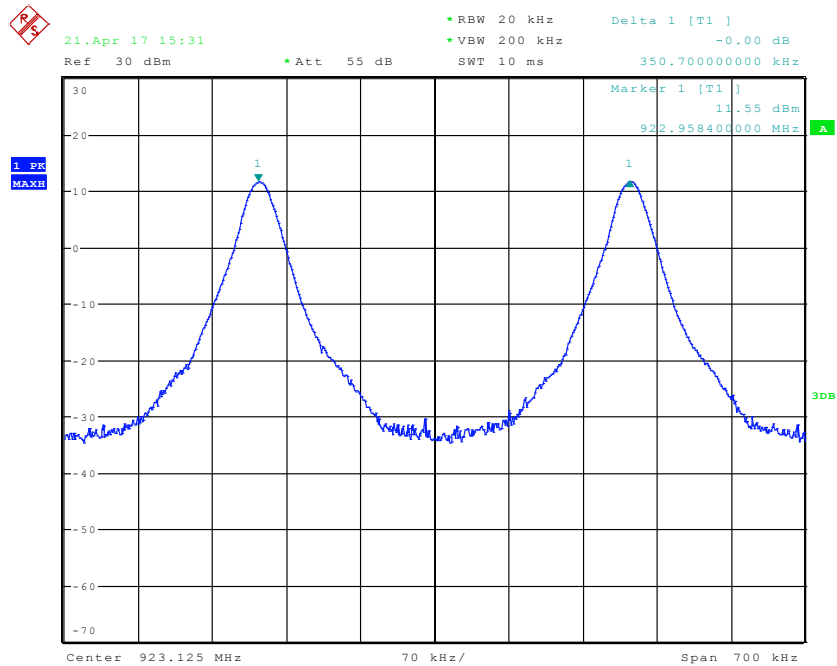
Date: 21.APR.2017 15:06:55

Channel 16 to 17 (Walkie Talkie)



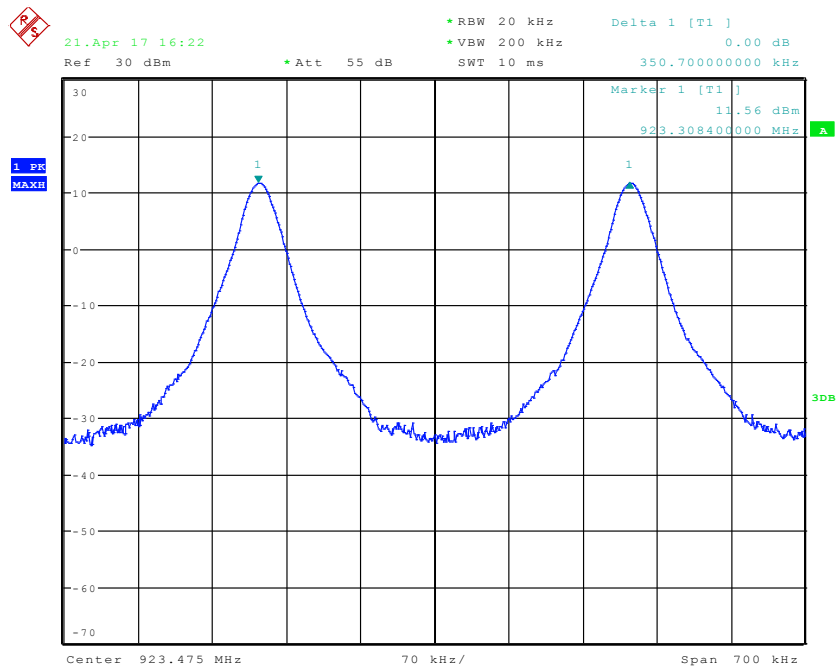
Date: 21.APR.2017 15:57:15

Channel 17 to 18 (Walkie Talkie)



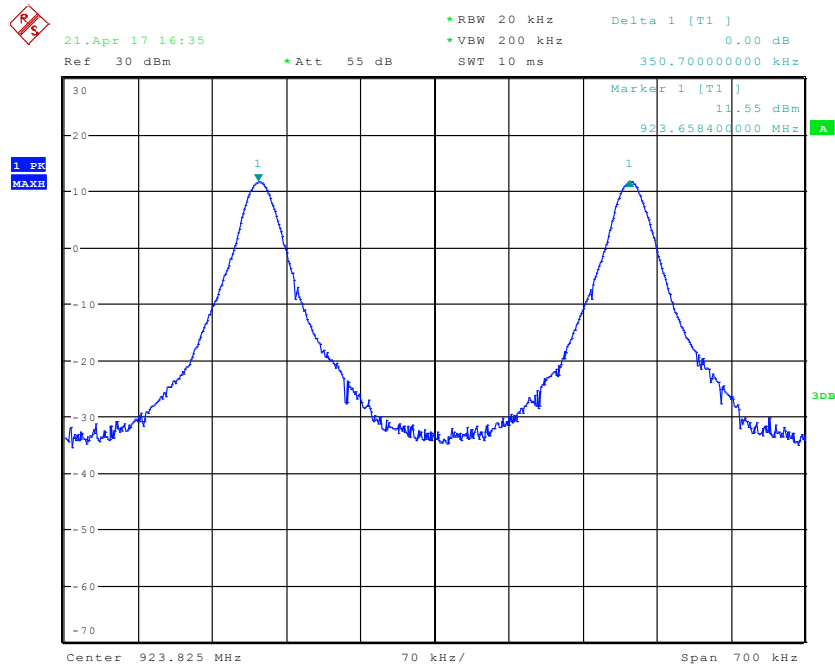
Date: 21.APR.2017 15:31:43

Channel 18 to 19 (Walkie Talkie)



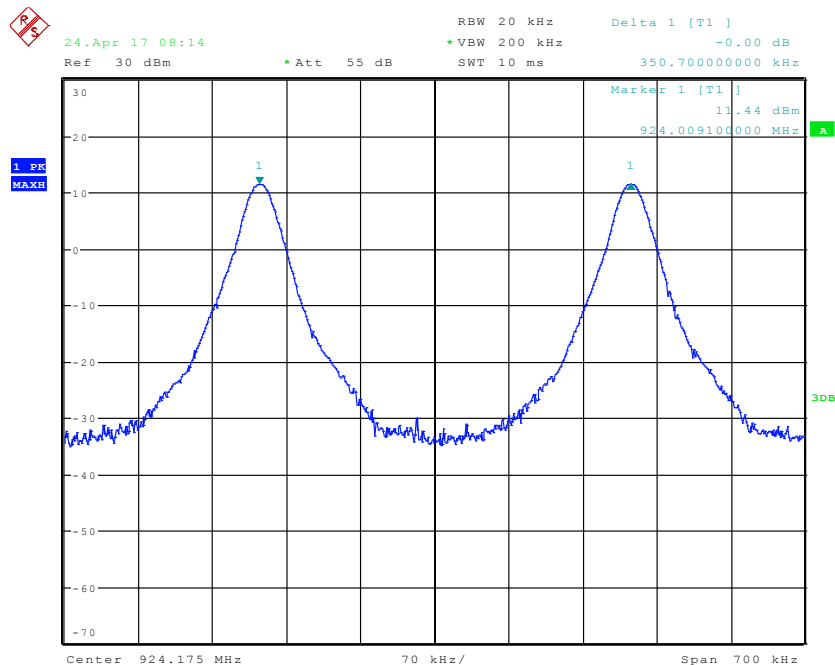
Date: 21.APR.2017 16:22:16

Channel 19 to 20 (Walkie Talkie)



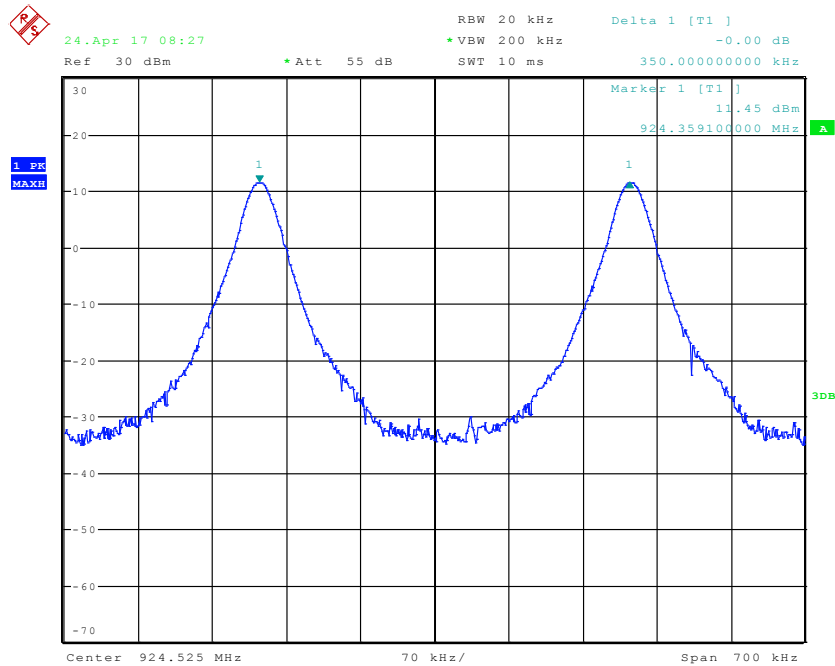
Date: 21.APR.2017 16:35:51

Channel 20 to 21 (Walkie Talkie)



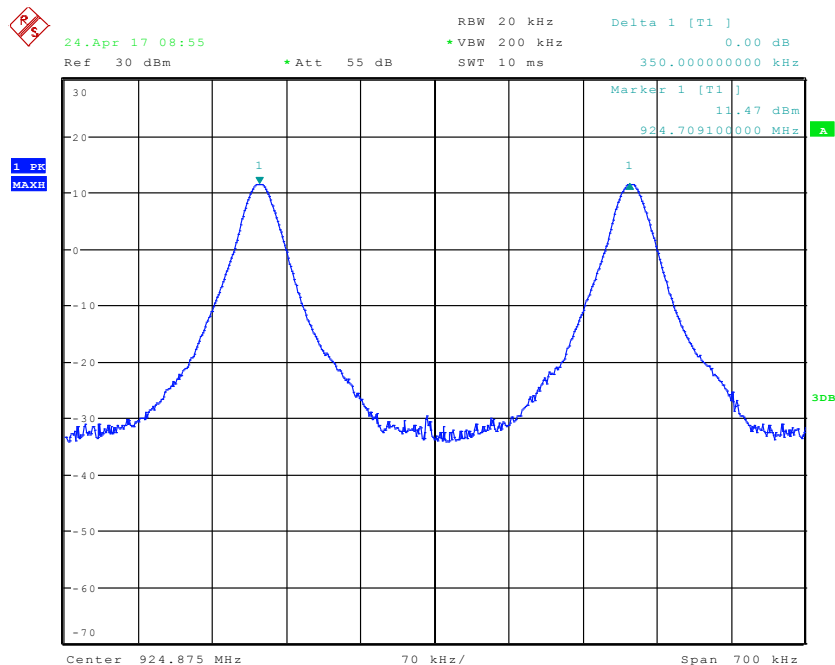
Date: 24.APR.2017 08:14:59

Channel 21 to 22 (Walkie Talkie)



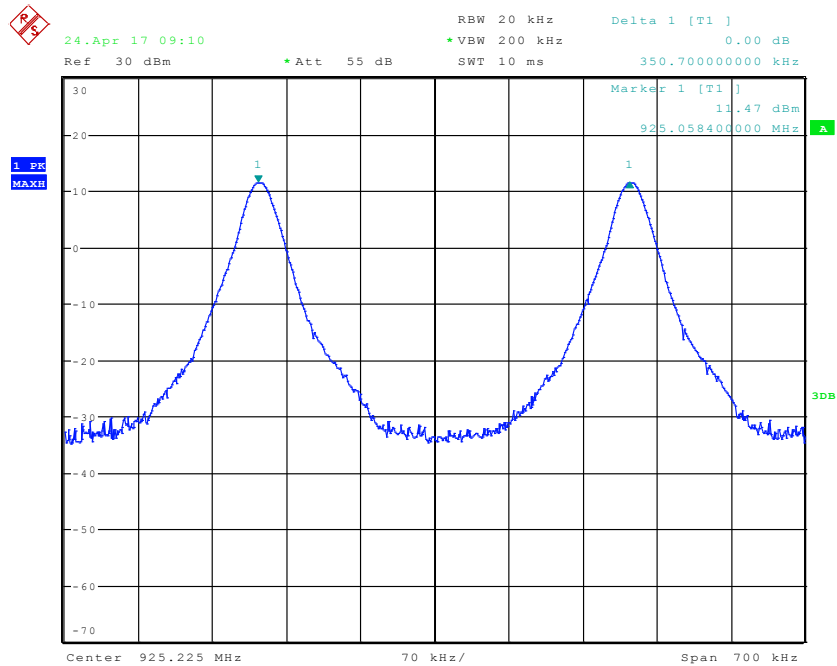
Date: 24.APR.2017 08:27:20

Channel 22 to 23 (Walkie Talkie)



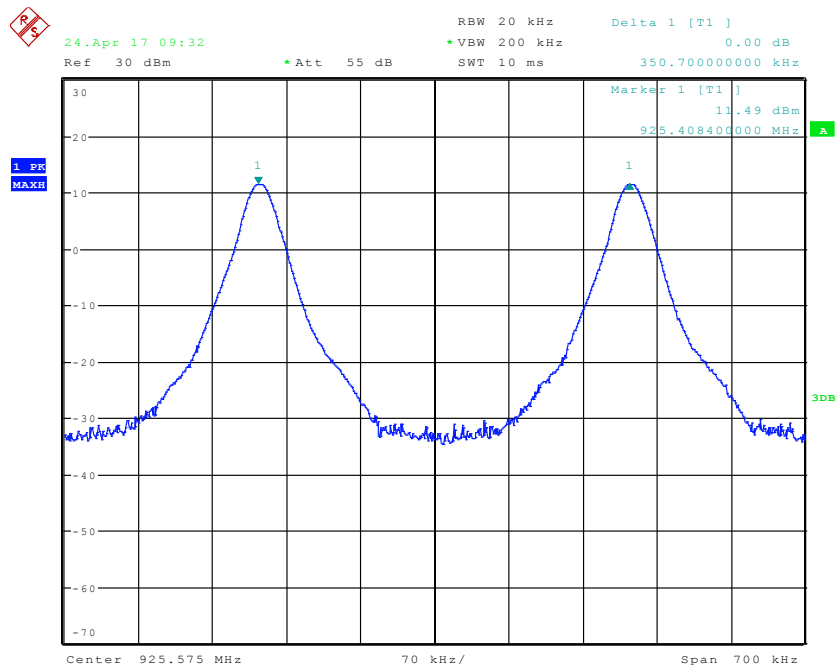
Date: 24.APR.2017 08:55:37

Channel 23 to 24 (Walkie Talkie)



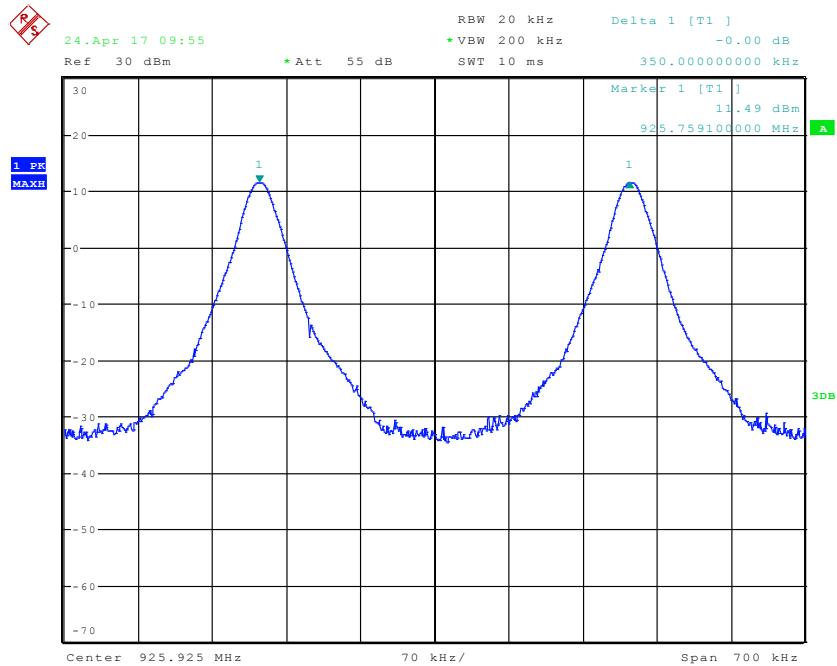
Date: 24.APR.2017 09:10:18

Channel 24 to 25 (Walkie Talkie)



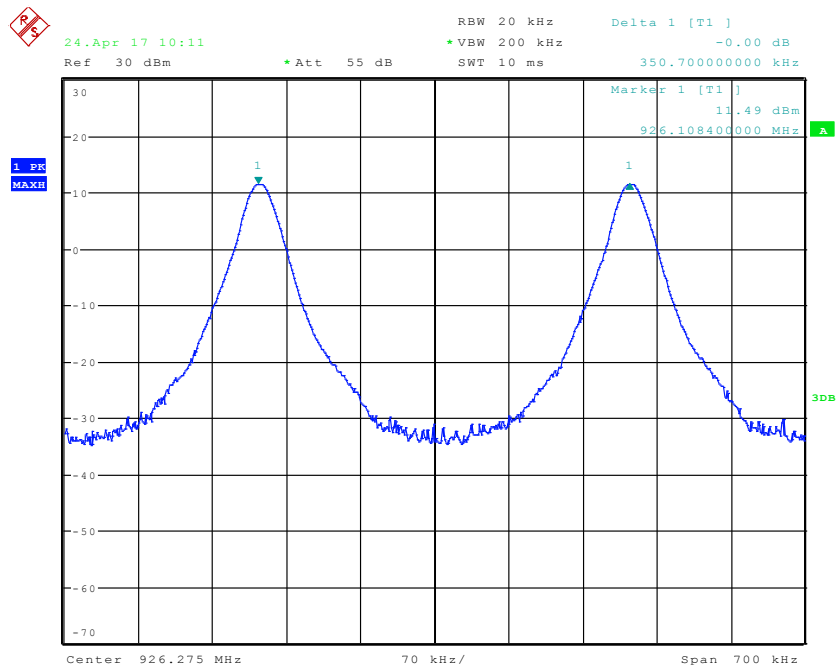
Date: 24.APR.2017 09:32:28

Channel 25 to 26 (Walkie Talkie)



Date: 24.APR.2017 09:55:26

Channel 26 to 27 (Walkie Talkie)



Date: 24.APR.2017 10:11:58

Channel 27 to 28 (Walkie Talkie)

TEST RESULT			
Channel (Walkie Talkie)	Measured value	Limit	Result
#	KHz		
1 to 2	350	>20dB BW	Pass
2 to 3	350	>20dB BW	Pass
3 to 4	350	>20dB BW	Pass
4 to 5	350	>20dB BW	Pass
5 to 6	350	>20dB BW	Pass
6 to 7	350	>20dB BW	Pass
7 to 8	350	>20dB BW	Pass
8 to 9	350	>20dB BW	Pass
9 to 10	350	>20dB BW	Pass
10 to 11	350.7	>20dB BW	Pass
11 to 12	350	>20dB BW	Pass
12 to 13	350	>20dB BW	Pass
13 to 14	1349	>20dB BW	Pass
28 (Normal) to 15 (Walkie Talkie)	350	>20dB BW	Pass
15 to 16	1352	>20dB BW	Pass
16 to 17	350.7	>20dB BW	Pass
17 to 18	350.7	>20dB BW	Pass
18 to 19	350.7	>20dB BW	Pass
19 to 20	350.7	>20dB BW	Pass
20 to 21	350.7	>20dB BW	Pass
21 to 22	350.7	>20dB BW	Pass
22 to 23	350	>20dB BW	Pass
23 to 24	350	>20dB BW	Pass
24 to 25	350.7	>20dB BW	Pass
25 to 26	350.7	>20dB BW	Pass
26 to 27	350	>20dB BW	Pass
27 to 28	350.7	>20dB BW	Pass
Channel (Normal)	Measured value	Limit	Result
#	KHz		
1 to 2	350	>20dB BW	Pass
2 to 3	350	>20dB BW	Pass
3 to 4	350	>20dB BW	Pass
4 to 5	350	>20dB BW	Pass
5 to 6	350	>20dB BW	Pass
6 to 7	350	>20dB BW	Pass
7 to 8	350	>20dB BW	Pass
8 to 9	350	>20dB BW	Pass
9 to 10	350	>20dB BW	Pass
10 to 11	350.7	>20dB BW	Pass
11 to 12	350.7	>20dB BW	Pass
12 to 13	350.7	>20dB BW	Pass
13 to 14	350.7	>20dB BW	Pass
14 to 15	2352	>20dB BW	Pass
15 to 16	350.7	>20dB BW	Pass
16 to 17	350.7	>20dB BW	Pass
17 to 18	350.7	>20dB BW	Pass
18 to 19	350.7	>20dB BW	Pass

19 to 20	350.7	>20dB BW	Pass
20 to 21	350.7	>20dB BW	Pass
21 to 22	350.7	>20dB BW	Pass
22 to 23	350.7	>20dB BW	Pass
23 to 24	350.7	>20dB BW	Pass
24 to 25	350.7	>20dB BW	Pass
25 to 26	350.7	>20dB BW	Pass
26 to 27	350.7	>20dB BW	Pass
27 to 28	350.7	>20dB BW	Pass

TEST SETUP PHOTOGRAPH

Refer Annexure -1

Conducted RF Test setup

2.4 NUMBER OF HOPPING FREQUENCIES

EUT Nomenclature	Wireless Smoke Detector	Test Request No.	20295-1
Model No.	FWD-200ACCLIMATE	Serial No.	MEL-150
Test Start Date	2017-04-24	Temperature (°C)	23.6°C
Test End Date	2017-04-24	Humidity RH (%)	51.9%RH
Tested By	Chris Locke	Pressure (mbar)	NR
Input Voltage / Freq.	3.3 Vdc		
Operating Mode	Refer Page 5 for Operating Mode Table		
Test configuration	Refer Page 5 for Test Configuration Table		
Deviation from Std.	NA		
Applicable standard	FCC Part 15.247 :2010		
Test Method	DA 00-705		
Comment	NA		

TEST DETAILS

Method	Radiated ☐	Conducted ☒
--------	-----------------------------------	---

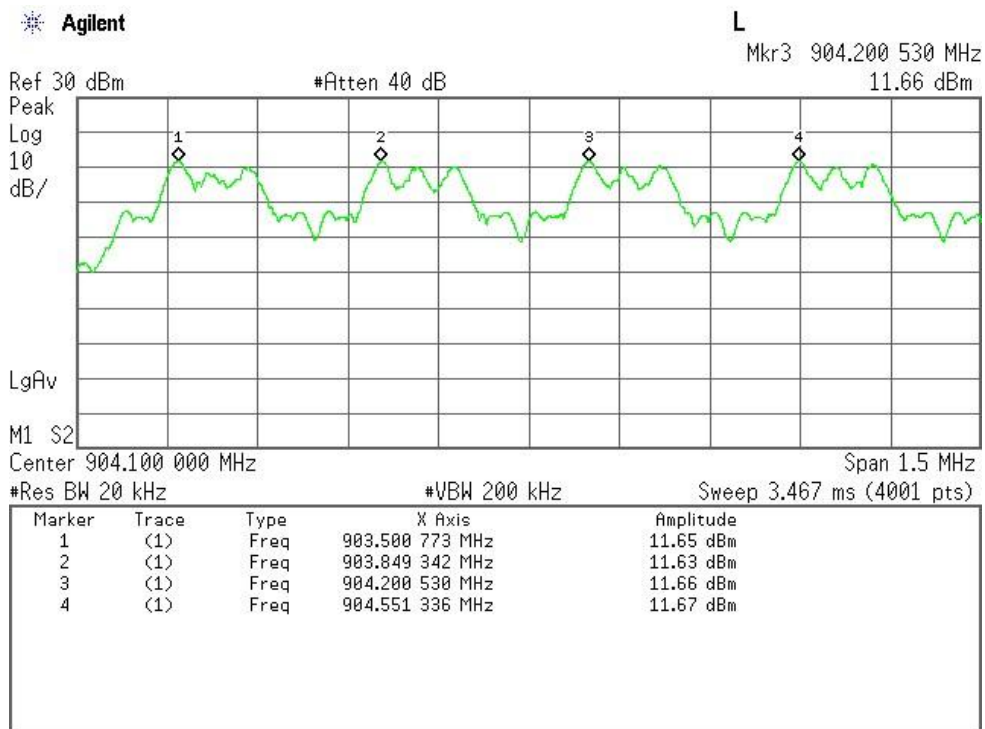
TEST PARAMETERS

Antenna Height	NA	Turntable Rotation	NA
Equipment Class	NA	Measurement Distance	NA

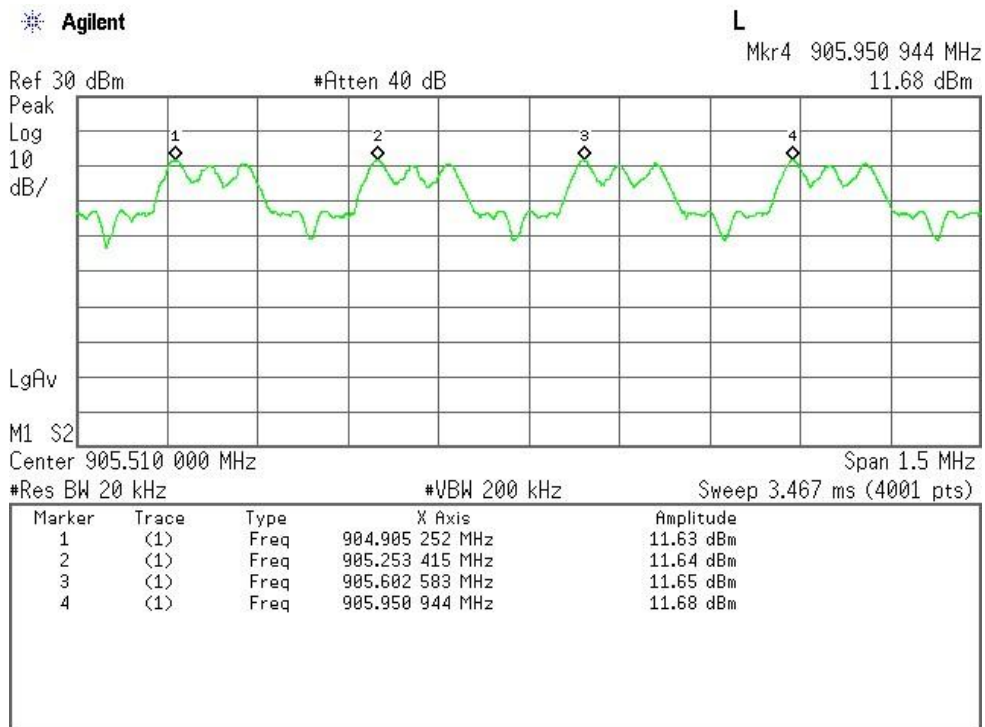
TEST EQUIPMENT

Y/N	Equipment	Make	Model	Serial Number	Cal Due Date
Y	Spectrum Analyzer	Agilent	E4440A	MY41000078	2017-05-18
Y	RF Cable	Digikey	1	NA	NA

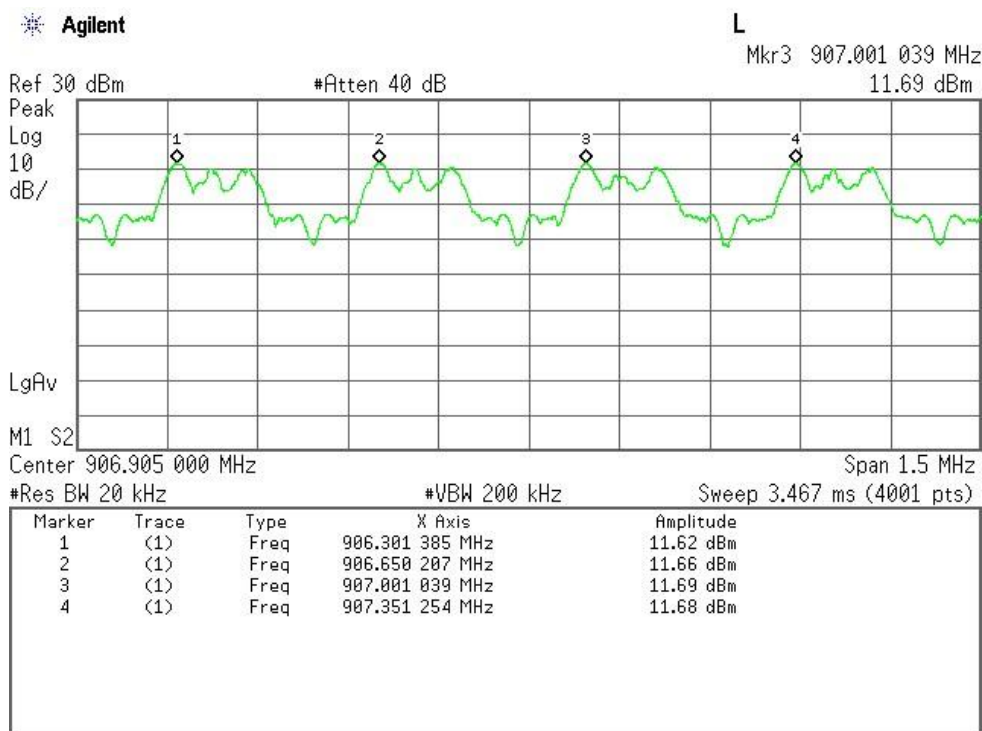
TEST GRAPHS



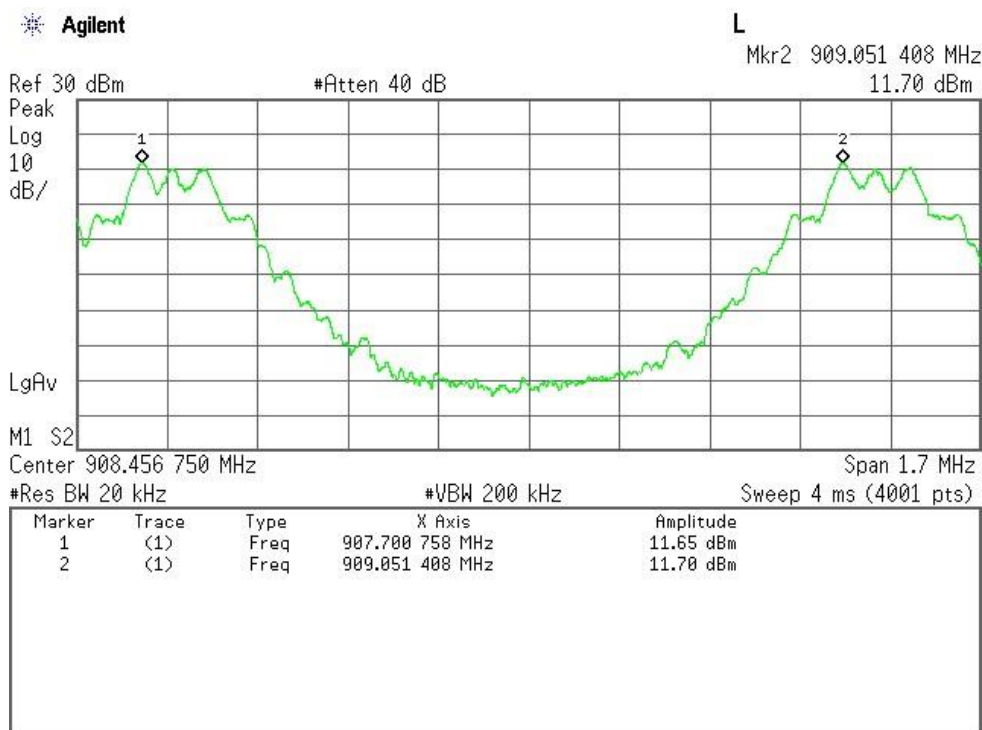
Channel 1-4 (Walkie-Talkie Mode)



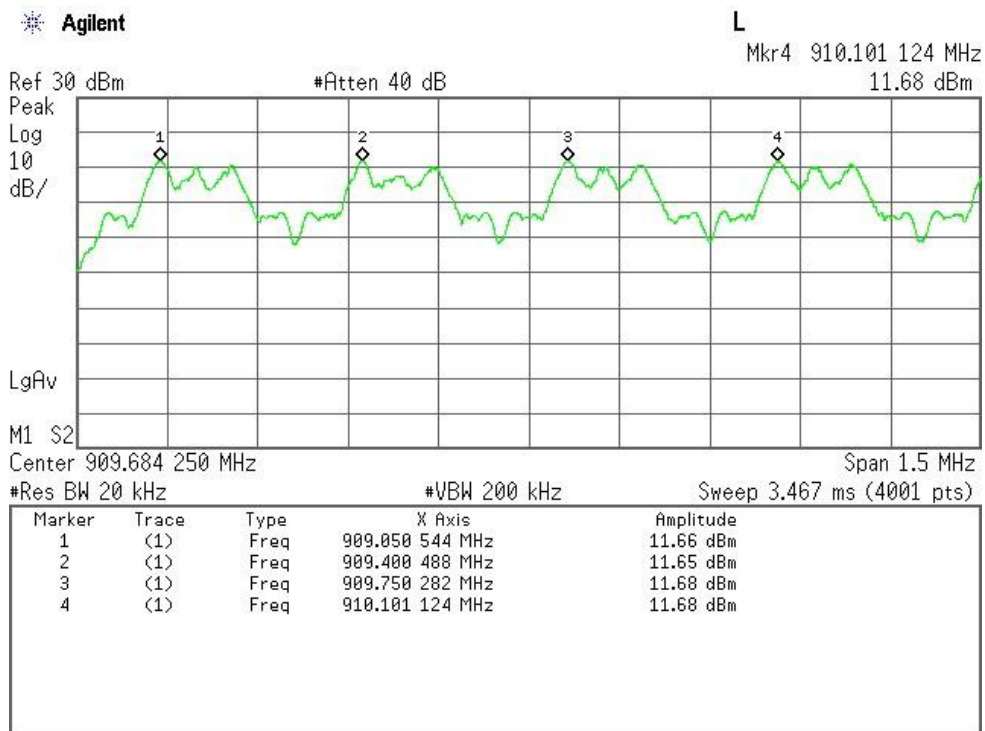
Channel 5-8 (Walkie-Talkie Mode)



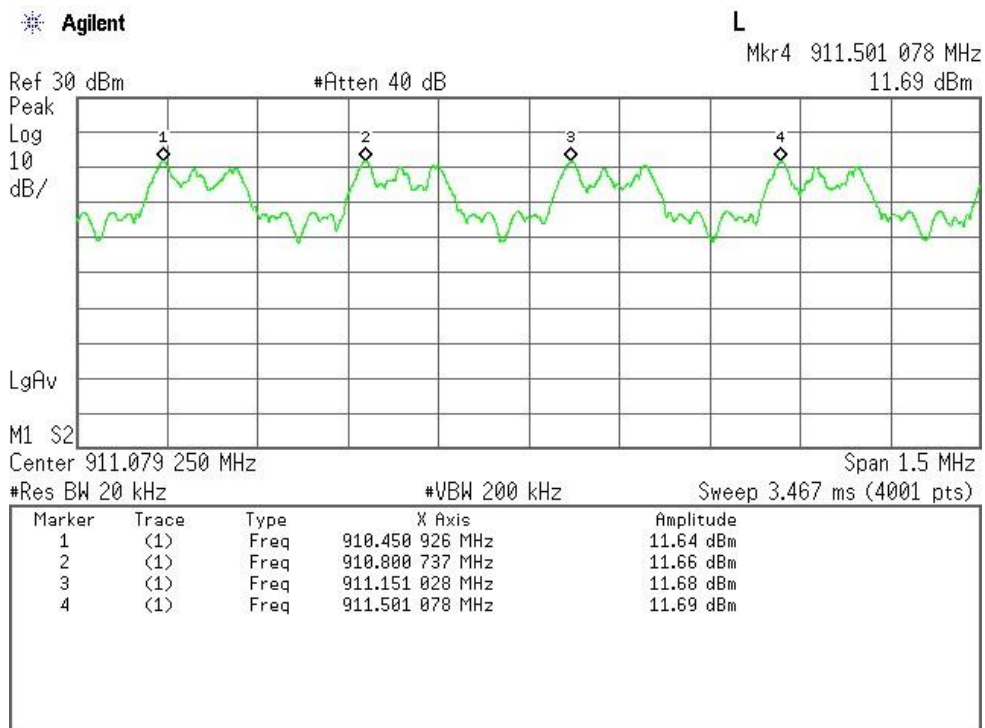
Channel 9-12 (Normal Mode)



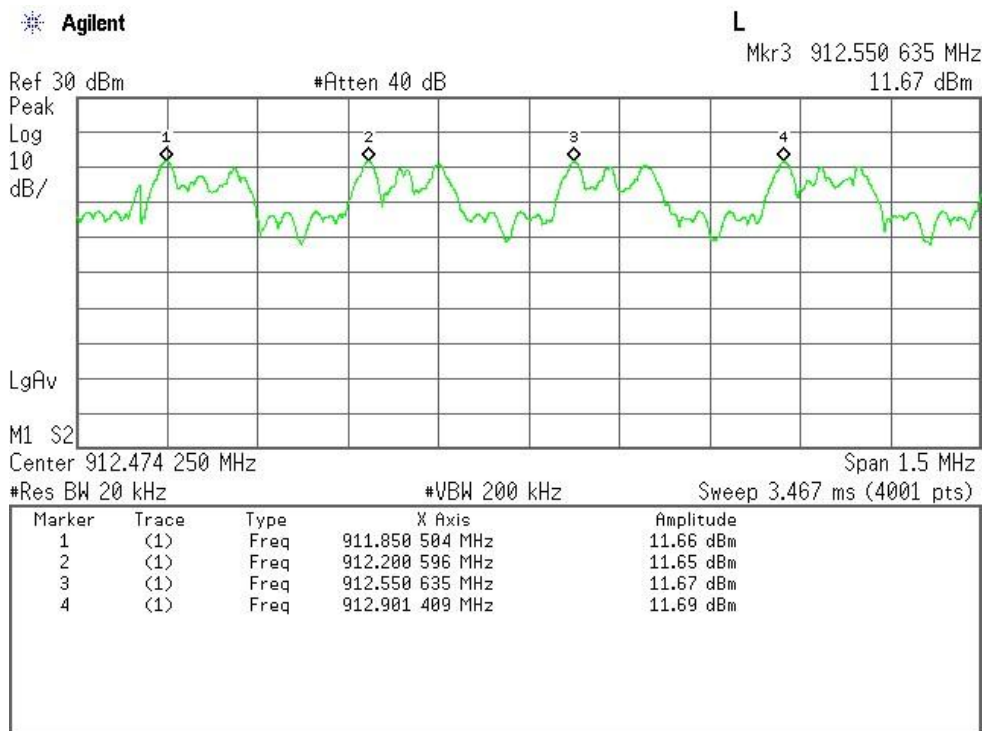
Channel 13-14 (Normal Mode)



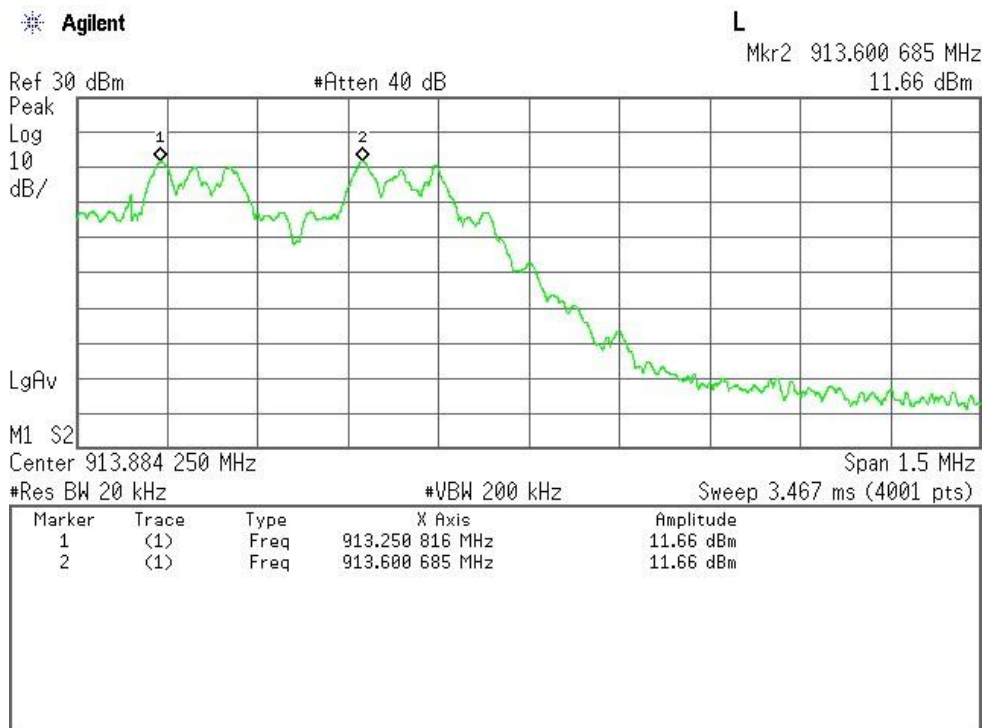
Channel 1-4 (Normal Mode)



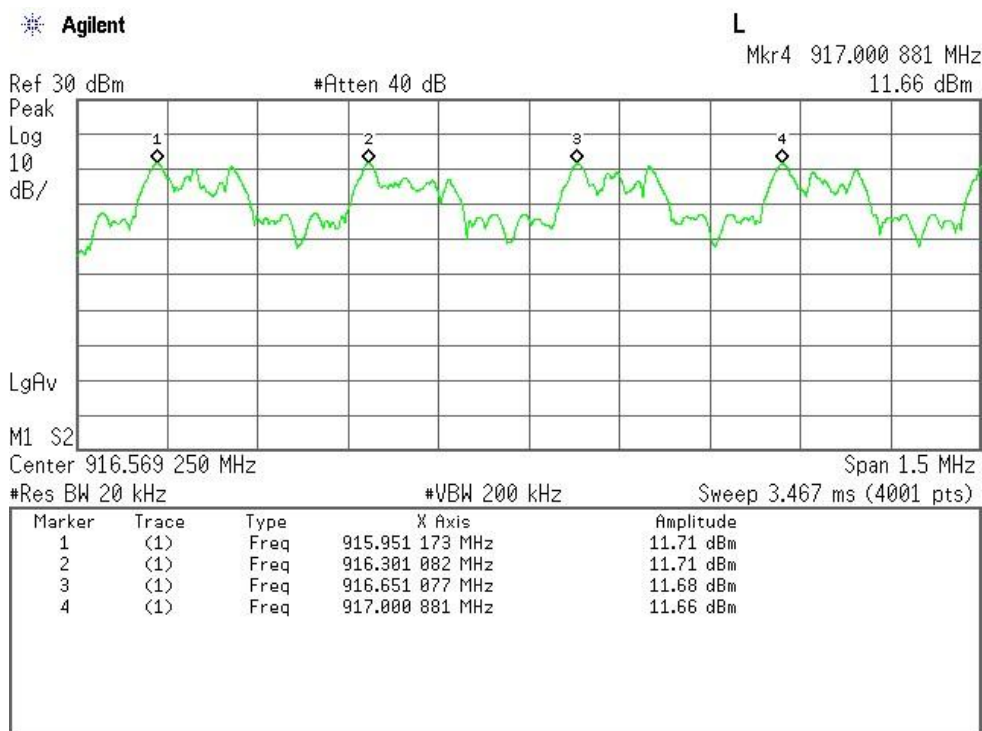
Channel 5-8 (Normal Mode)



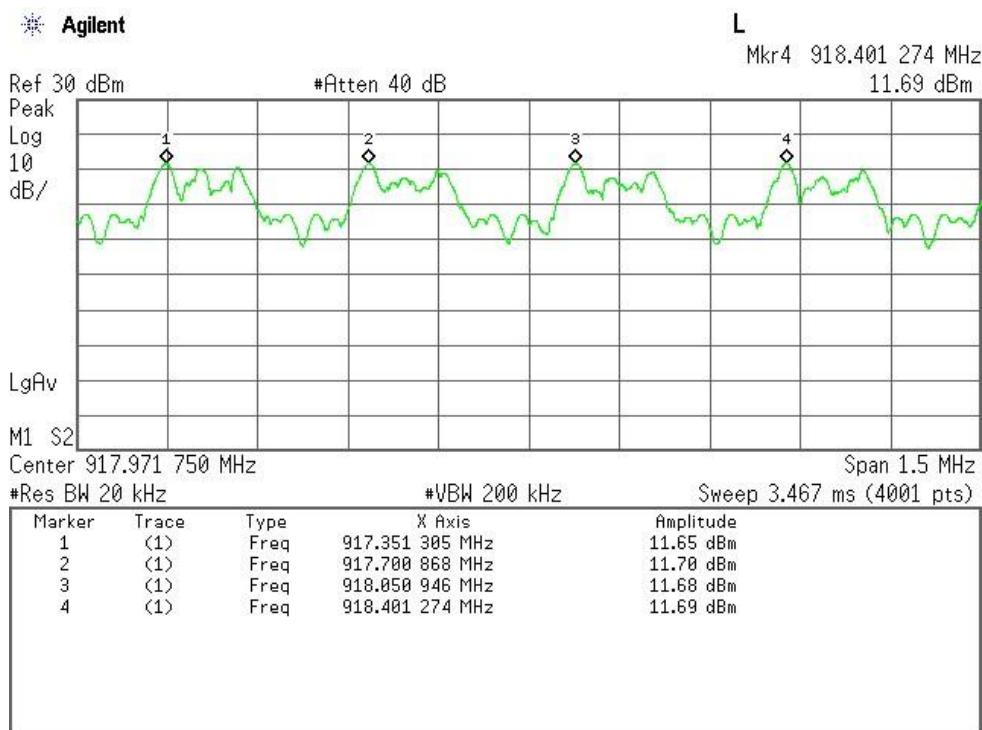
Channel 9-12 (Normal Mode)



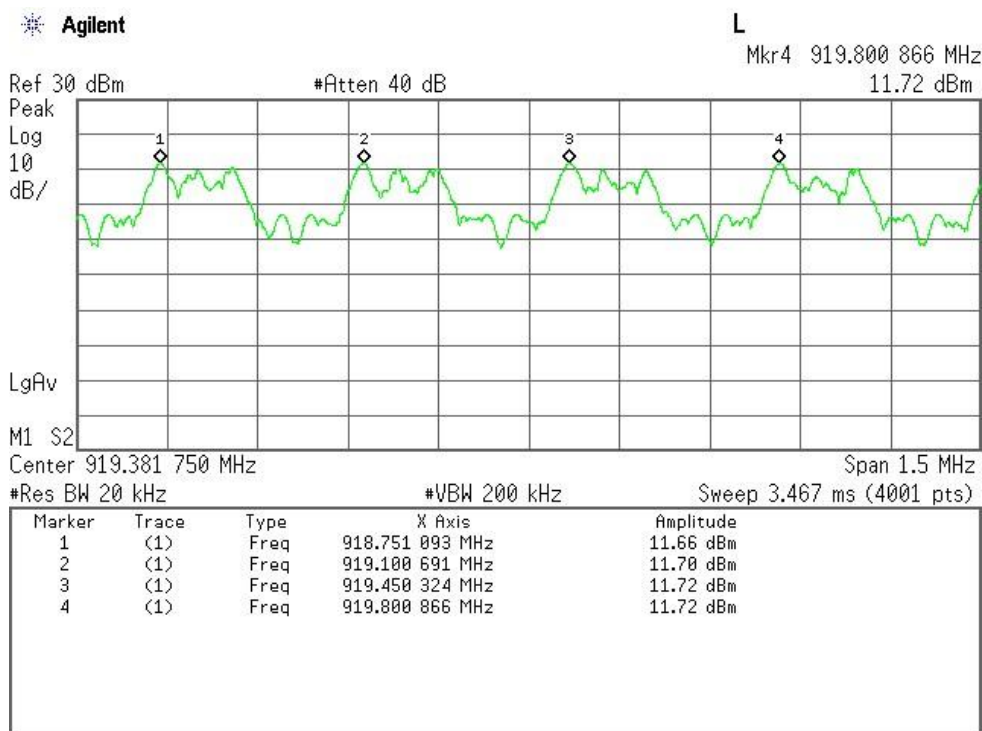
Channel 13-14 (Normal Mode)



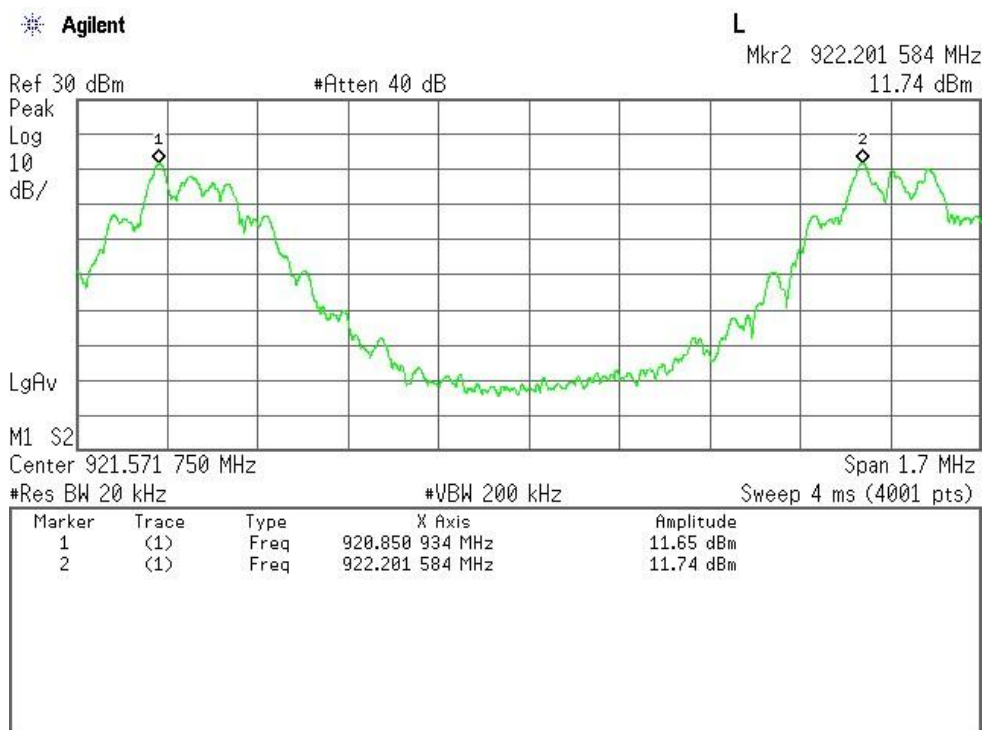
Channel 15-18 (Normal Mode)



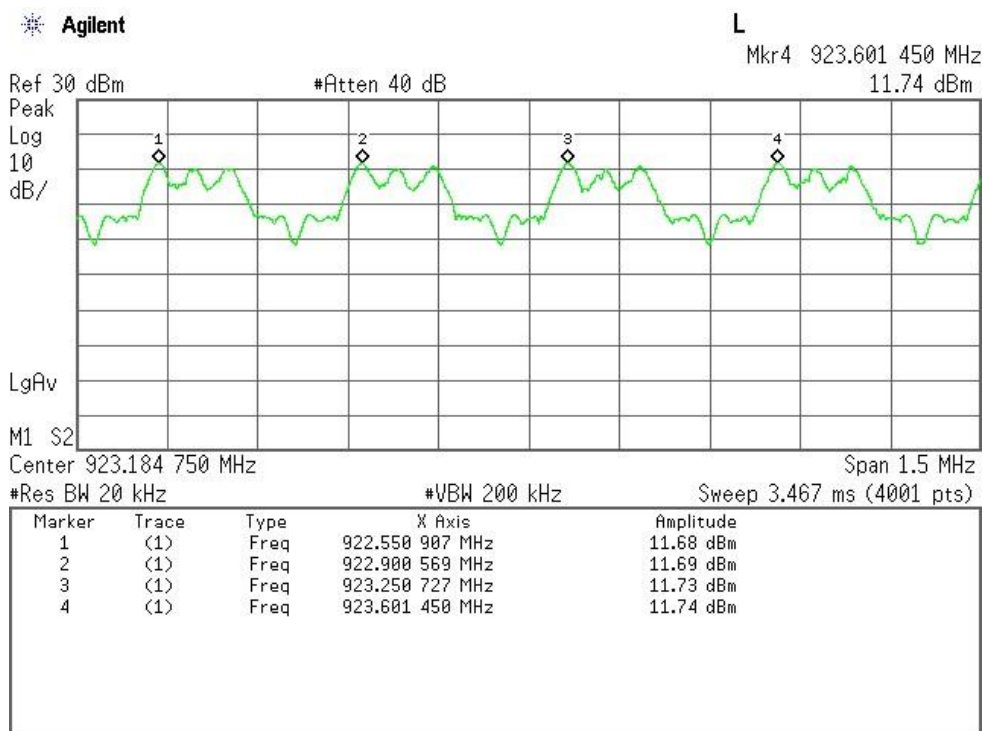
Channel 19-22 (Normal Mode)



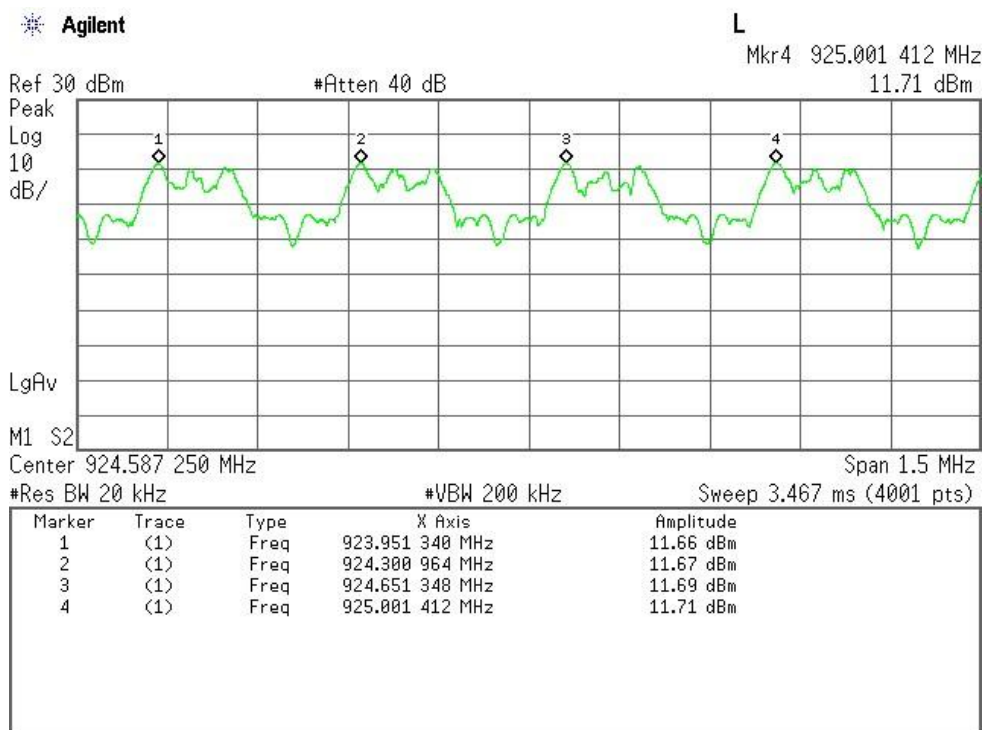
Channel 23-26 (Normal Mode)



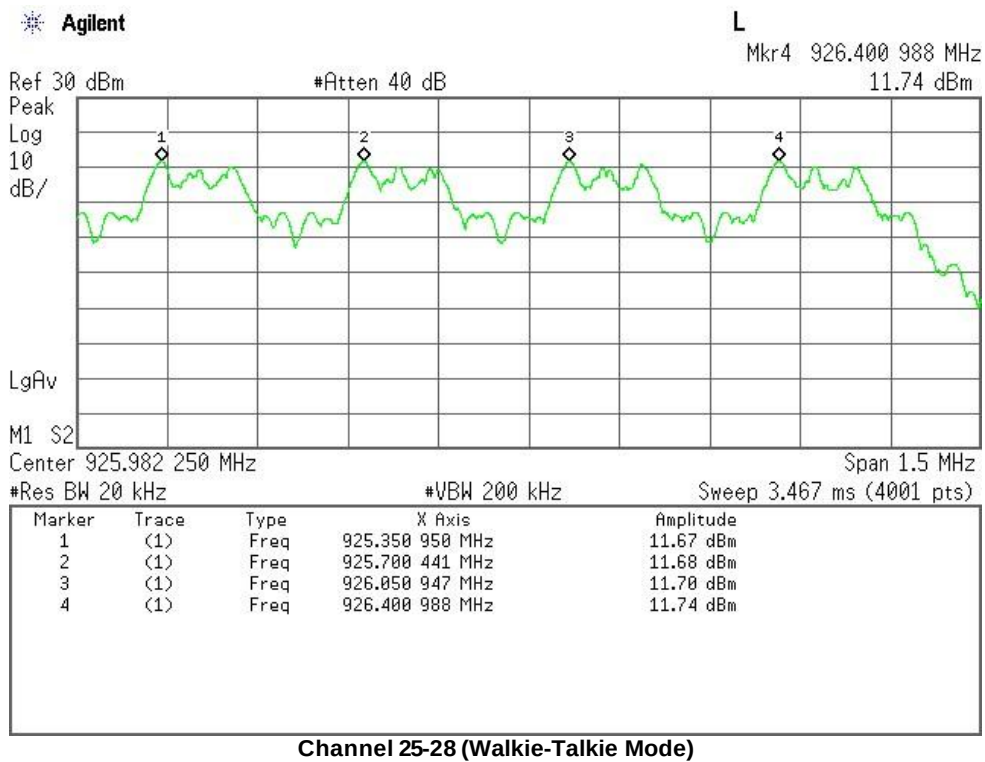
Channel 15-16 (Walkie-Talkie Mode)



Channel 17-20 (Walkie-Talkie Mode)



Channel 21-24 (Walkie-Talkie Mode)



TEST RESULT

Mode of Operation	No. of Channels Measured	Limit (No. of Channels)	Test Results
Normal Mode	28	≥25	PASS
Walkie-Talkie Mode	27	≥25	PASS

TEST SETUP PHOTOGRAPH

Refer Annexure -1

Conducted RF Test setup

2.5 BAND-EDGE COMPLIANCE

EUT Nomenclature	Wireless Smoke Detector	Test Request No.	20295-1
Model No.	FWD-200ACCLIMATE	Serial No.	MEL-150
Test Start Date	2016-08-24	Temperature (°C)	23.6°C
Test End Date	2016-09-06	Humidity RH (%)	51.9%RH
Tested By	Jose Badia/Arnoldo Garcia	Pressure (mbar)	NR
Input Voltage / Freq.	3.3 Vdc		
Operating Mode	Refer Page 5 for Operating Mode Table		
Test configuration	Refer Page 5 for Test Configuration Table		
Deviation from Std.	NA		
Applicable standard	FCC Part 15.247:2010		
Test Method	DA 00-705		
Comment	NA		

TEST DETAILS

Method	Radiated ☐	Conducted ☒
--------	-----------------------------------	---

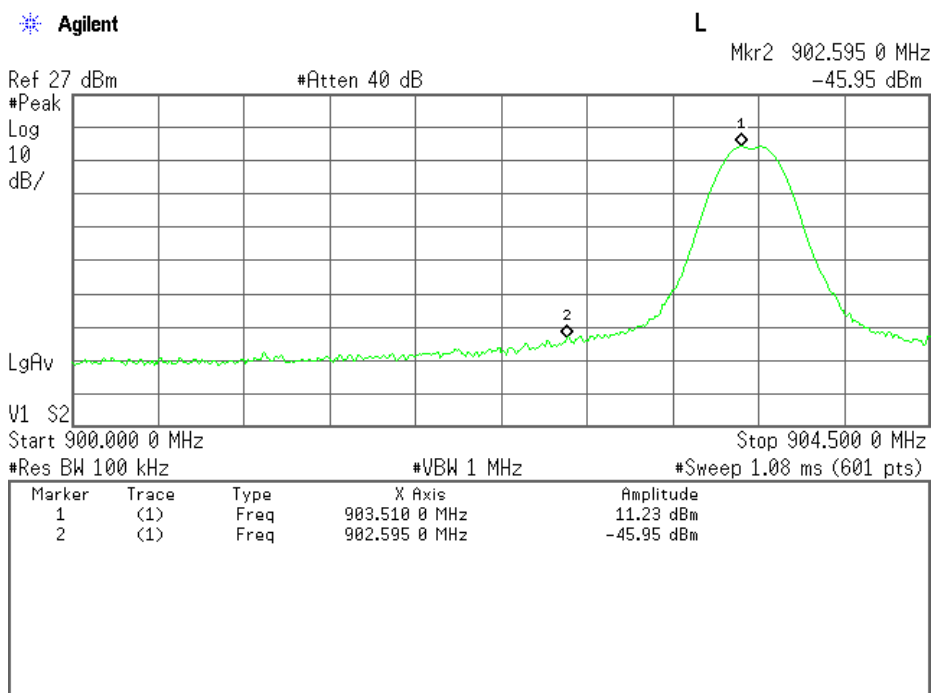
TEST PARAMETERS

Antenna Height	NA	Turntable Rotation	NA
Equipment Class	NA	Measurement Distance	NA

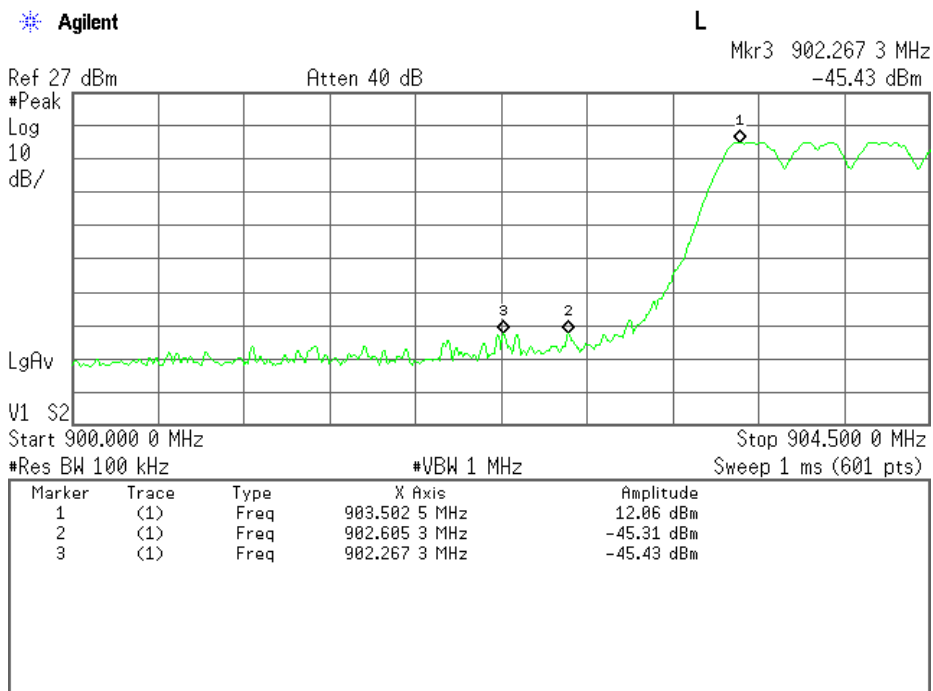
TEST EQUIPMENT

Y/N	Equipment	Make	Model	Serial Number	Cal Due Date
Y	Spectrum Analyzer	Agilent	E4440A	MY41000078	2017-05-18
Y	RF Cable	Digikey	1	NA	NA

TEST GRAPHS



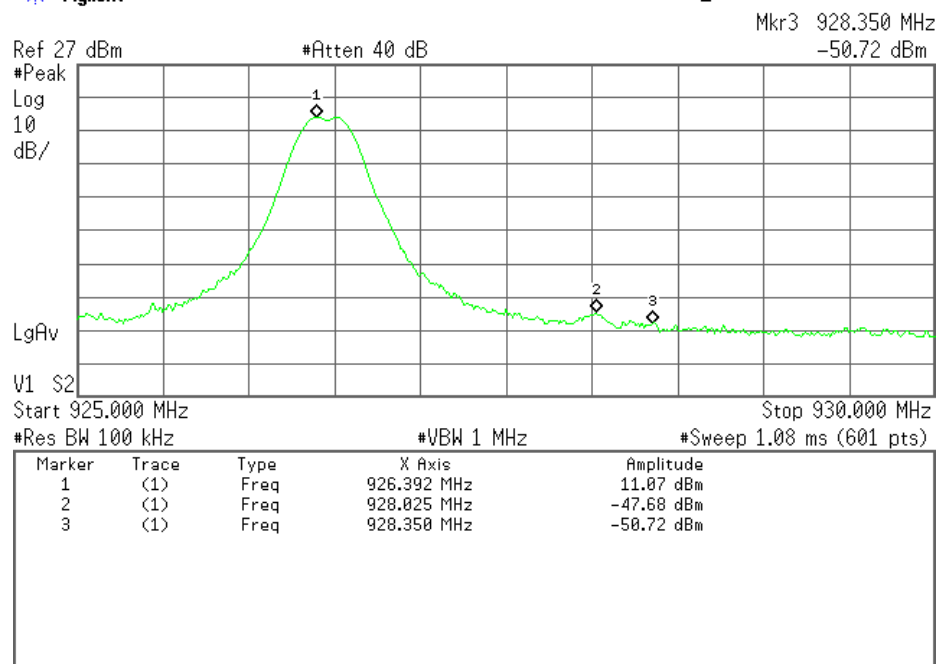
Band-edge at 902 MHz - Channel 1 (903.55 MHz)



Band-edge at 902 MHz - Hopping Enabled

Agilent

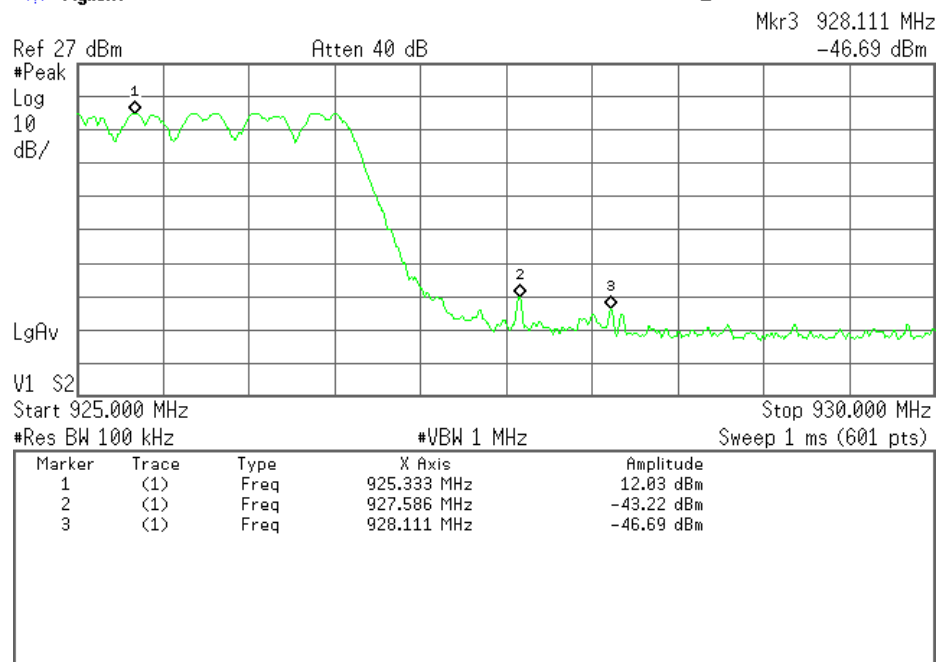
L



Band-edge at 928 MHz - Channel 55 (926.45 MHz)

Agilent

L



Band-edge at 928 MHz – Hopping Enabled

TEST RESULT

Channel	Frequency	Measured difference		Limit	Test Results
#	MHz	SINGLE CHANNEL	FHSS ENABLED	dBc	
1	903.355	57.18	57.49	>20	PASS
55	926.45	58.75	55.25	>20	PASS

TEST SETUP PHOTOGRAPH

Refer Annexure -1

Conducted RFTest setup

2.6 TIME OF OCCUPANCY (DWELL TIME)

EUT Nomenclature	Wireless Smoke Detector	Test Request No.	20295-1
Model No.	FWD-200ACCLIMATE	Serial No.	MEL-150
Test Start Date	2017-04-24	Temperature (°C)	23.6°C
Test End Date	2017-04-24	Humidity RH (%)	51.9%RH
Tested By	Chris Locke	Pressure (mbar)	NR
Input Voltage / Freq.	3.3 Vdc		
Operating Mode	Refer Page 5 for Operating Mode Table		
Test configuration	Refer Page 5 for Test Configuration Table		
Deviation from Std.	NA		
Applicable standard	FCC Part 15.247:2010		
Test Method	DA 00-705		
Comment	NA		

TEST DETAILS

Method	Radiated ☐	Conducted ☒
--------	-----------------------------------	---

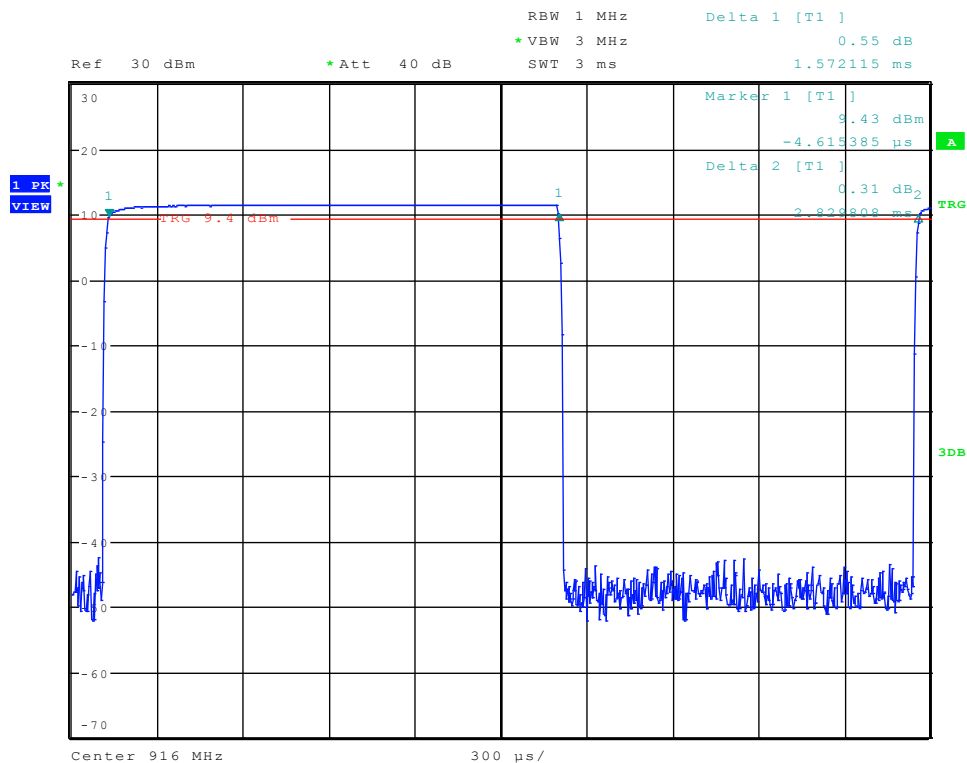
TEST PARAMETERS

Antenna Height	NA	Turntable Rotation	NA
Equipment Class	NA	Measurement Distance	NA

TEST EQUIPMENT

Y/N	Equipment	Make	Model	Serial Number	Cal Due Date
Y	Spectrum Analyzer	Rohde & Schwarz	FSU26	100303	2018-04-10
Y	RF Cable	Digikey	1	NA	NA

TEST GRAPHS



Date: 24.APR.2017 10:51:43

Channel 28 (916 MHz)

TEST RESULT

Channel	Channel Frequency	Measured DwellTime	No. of Bursts	Total Dwell Time in 10sec	Limit in 10s period	Results
#	MHz	ms	#	ms	ms	
28	916	1.572	15	23.58	≤ 400	PASS

TEST SETUP PHOTOGRAPHS

Refer Annexure -1

Conducted RF Test setup

2.7 SPURIOUS RF CONDUCTED EMISSIONS

EUT Nomenclature	Wireless Smoke Detector	Test Request No.	20295-1
Model No.	FWD-200ACCLIMATE	Serial No.	MEL-150
Test Start Date	2017-04-19	Temperature (°C)	23.6°C
Test End Date	2017-04-19	Humidity RH (%)	51.9%RH
Tested By	Jose Badia	Pressure (mbar)	NR
Input Voltage / Freq.	3.3 Vdc		
Operating Mode	Refer Page 5 for Operating Mode Table		
Test configuration	Refer Page 5 for Test Configuration Table		
Deviation from Std.	NA		
Applicable standard	FCC Part 15.247:2010		
Test Method	DA 00-705		
Comment	NA		

TEST DETAILS

Method	Radiated ☐	Conducted ☒
--------	-----------------------------------	---

TEST PARAMETERS

Antenna Height	NA	Turntable Rotation	NA
Equipment Class	NA	Measurement Distance	NA

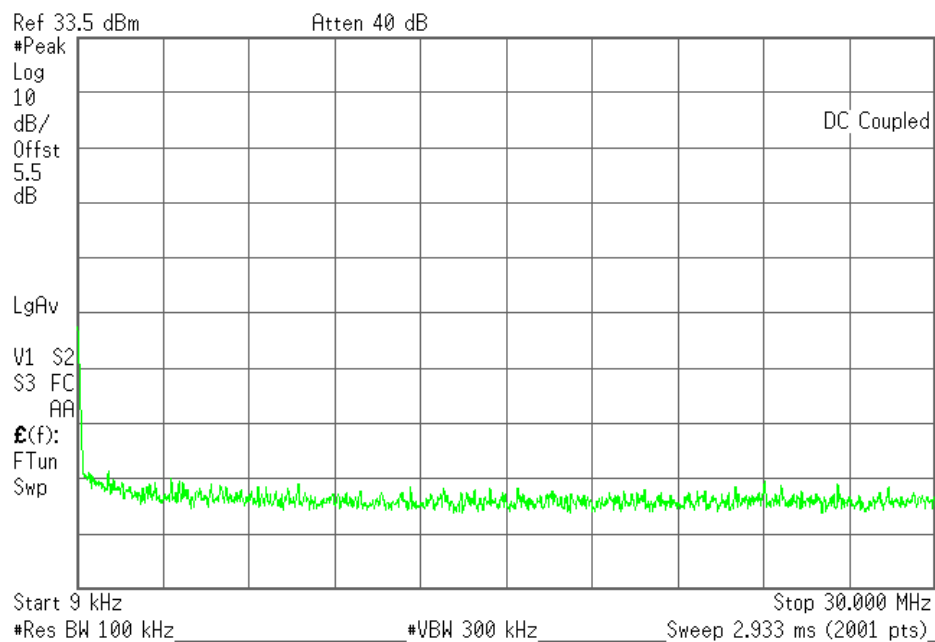
TEST EQUIPMENT

Y/N	Equipment	Make	Model	Serial Number	Cal Due Date
Y	Spectrum Analyzer	Agilent	E4440A	MY41000078	2017-05-18
Y	RF Cable	Digikey	1	NA	NA

TEST GRAPHS

Agilent

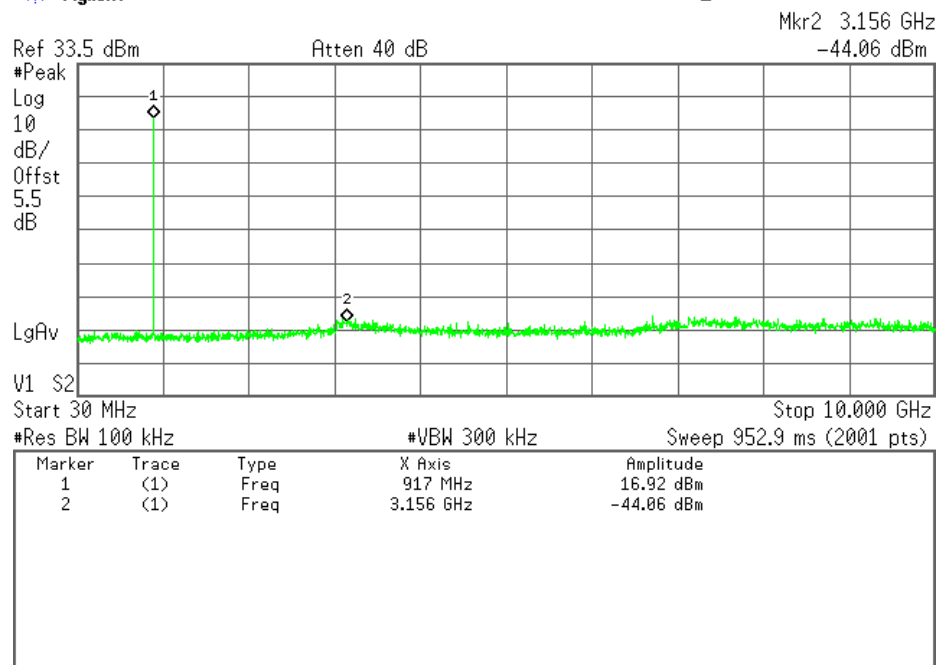
L



Channel 28 (916 MHz) – 9kHz-30MHz

Agilent

L



Channel 28 (916 MHz) – 30MHz-10GHz

TEST RESULT					
Channel	Channel Frequency	Measured Parameters		Limit	Result
#	MHz	Frequency (GHz)	Level (dBm)	dBc	
28	916	3.156	-44.06	>20	PASS

TEST SETUP PHOTOGRAPH

Refer Annexure -1

Conducted RFT test setup

2.8 SPURIOUS RADIATED EMISSIONS

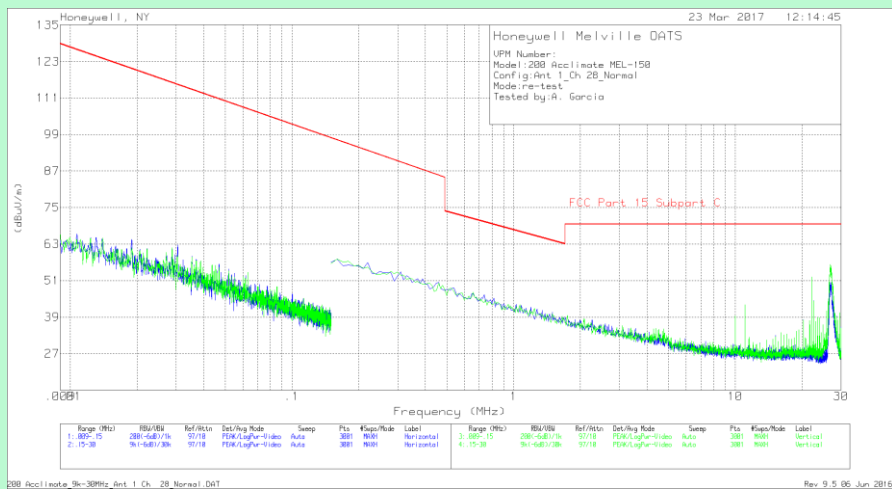
EUT Nomenclature	Wireless Smoke Detector	Test Request No.	20295-1
Model No.	FWD-200ACCLIMATE	Serial No.	MEL-150
Test Start Date	2016-09-22	Temperature (°C)	0°C-35°C
Test End Date	2017-03-28	Humidity RH (%)	10%RH-90%RH
Tested By	Jose Badia/Arnoldo Garcia/Chris Locke	Pressure (mbar)	NR
Input Voltage / Freq.	3.3 Vdc		
Operating Mode	Refer Page 5 for Operating Mode Table		
Test configuration	Refer Page 5 for Test Configuration Table		
Deviation from Std.	NA		
Comment	NA		
TEST FREQUENCY RANGE			
Start Frequency	9kHz	Stop Frequency	10GHz
MAXIMUM OPERATING FREQUENCY			
902 MHz to 928 MHz			
TEST PARAMETERS			
Antenna Height	1m to 4m	Turntable Rotation	0° to 360°
Applicable Standard	FCC Part 15.247 : 2010 & 15.209 : 2010	Test Method	ANSI 63.10 - 2013
Equipment Class	NA	Measurement Distance	3m

TEST EQUIPMENT

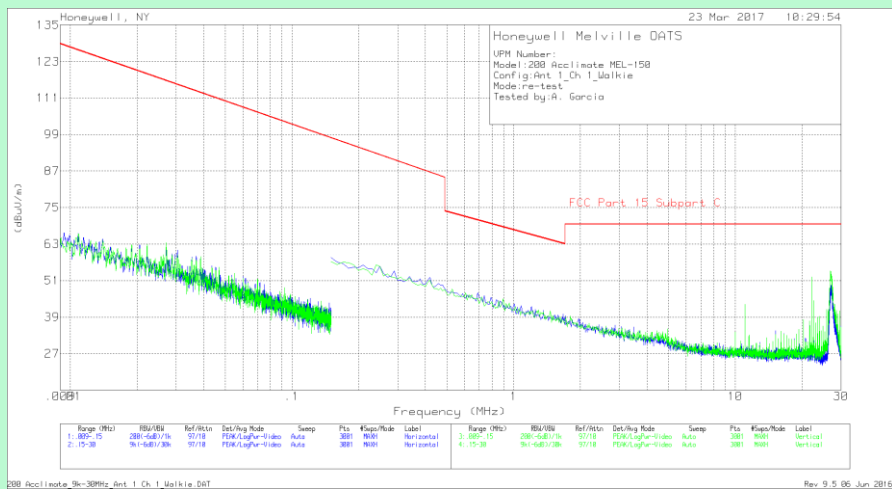
Y/N	Equipment	Make	Model	Sl. No.	Cal Due Date
Y	Spectrum Analyzer	Rohde & Schwarz	FSW26	103125	2018-02-14
Y	Spectrum Analyzer	Rohde & Schwarz	FSU26	100303	2017-03-31
Y	Bilog Antenna	Sunol	JB6	A012816	2018-03-09
Y	Bilog Antenna	Sunol	JB5	A022406	2017-12-18
Y	Horn Antenna	EMCO	RGA-60	3127	2017-02-03
Y	Preamplifier (Below 1GHz)	HP	8447D	2443AUF555	NA
Y	Preamplifier (Above 1GHz)	Amplicol	AMP1G18-35	160362	NA
Y	Active Loop Antenna	Com-Power	AL-130R	121080	2017-08-15

Note: Switch ON /OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver

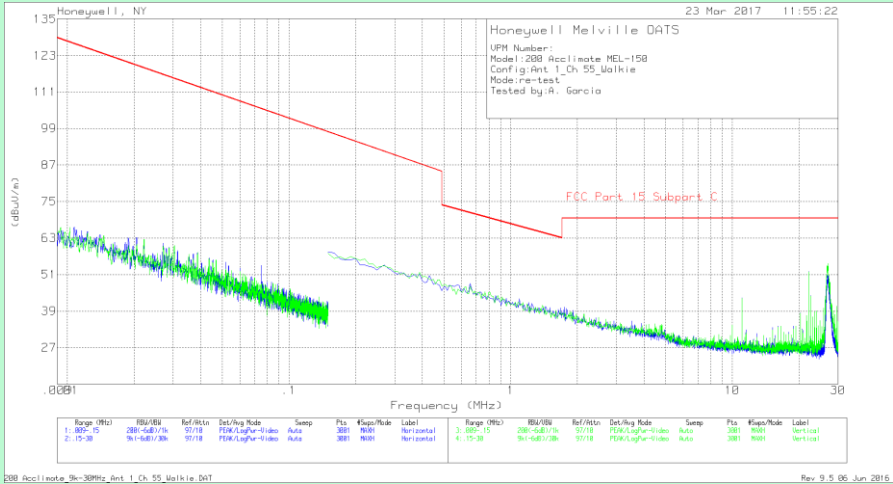
TEST GRAPHS – 9 KHz to 30 MHz (ANTENNA 1)



Channel 1 (903.55 MHz) – Antenna 1



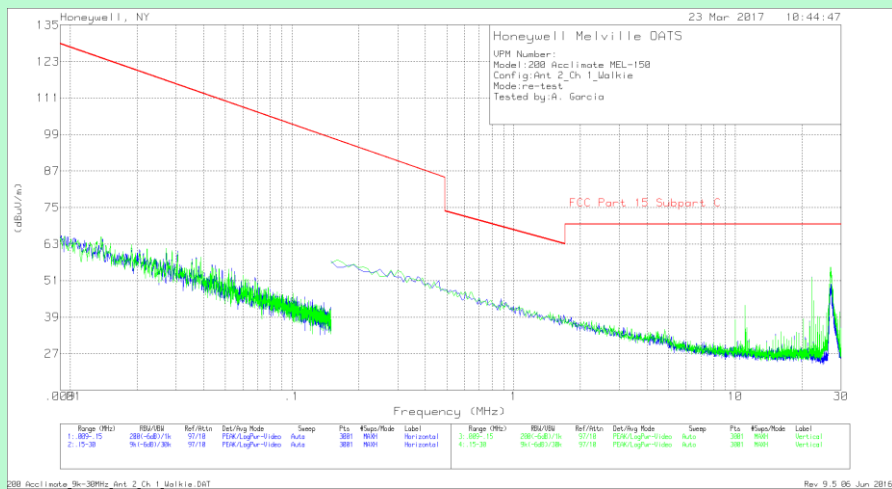
Channel 28 (916.00 MHz) – Antenna 1



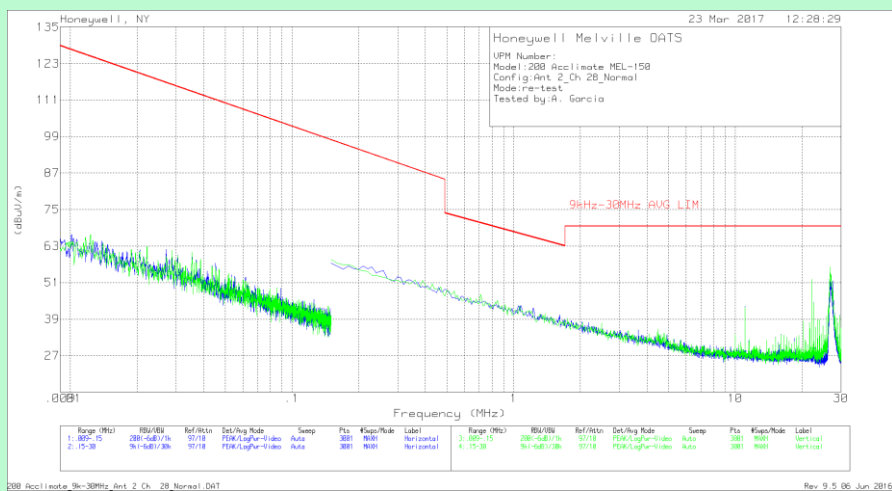
Channel 55 (926.45 MHz) – Antenna 1

TEST RESULT – 9 KHz to 30 MHz									
Channel	Channel Frequency	Measured Spurious	Quasi Peak	Height	Ant Pol	Azimuth	Margin	Limit @ 3m Distance	Results
#	MHz	MHz	dBµV/m	cm	Parallel / Perpendicular	deg	dB	dBµV/m	
No emissions detected that are a product of the transmitter. Emissions shown in the plot are related to the chamber ambient									
Note : Measured Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)									

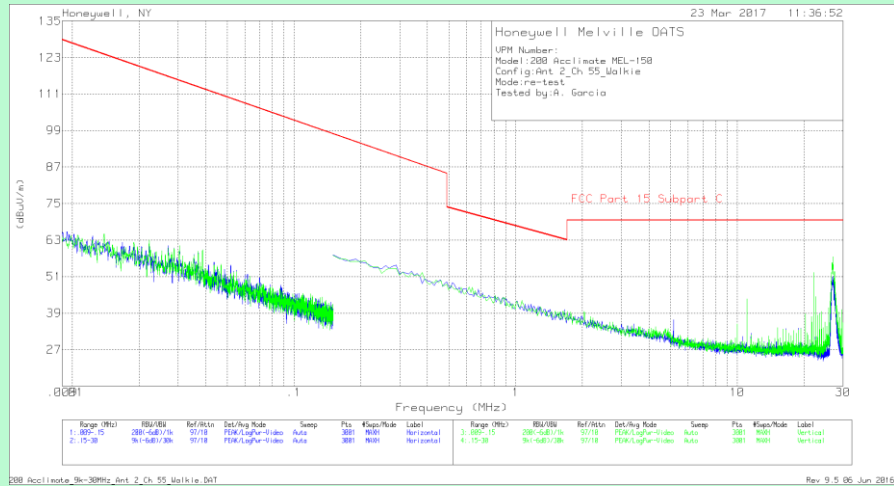
TEST GRAPHS – 9 KHz to 30 MHz (ANTENNA 2)



Channel 1 (903.55 MHz) – Antenna 2



Channel 28 (916.00MHz) – Antenna 2

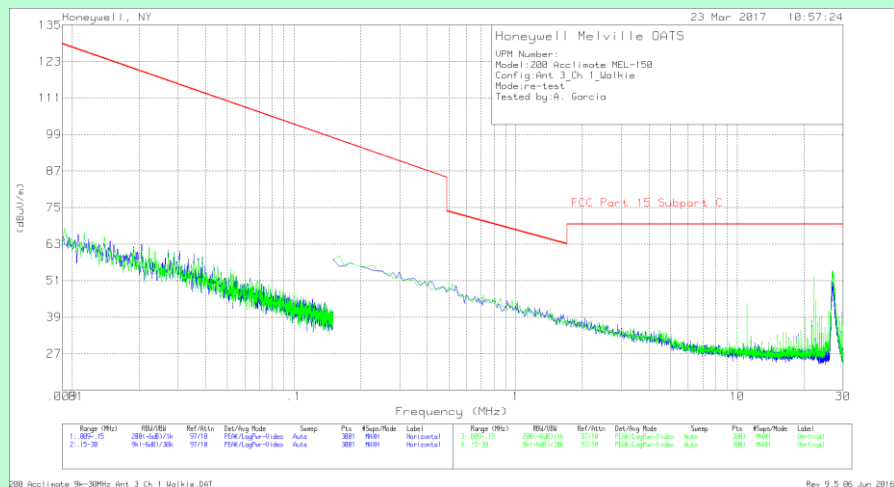


Channel 55 (926.45 MHz) – Antenna 2

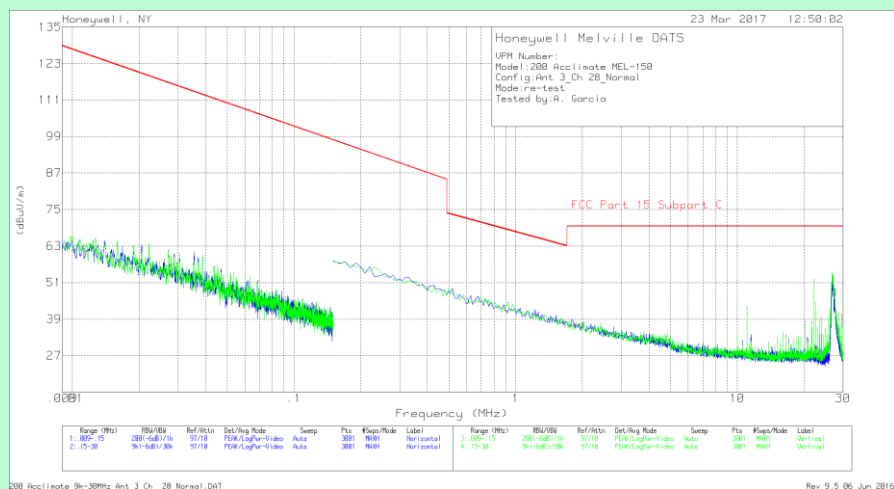
TEST RESULT – 9 KHz to 30 MHz

Channel	Channel Frequency	Measured Spurious	Quasi Peak	Height	Ant Pol	Azimuth	Margin	Limit @ 3m Distance	Results
#	MHz	MHz	dBµV/m	cm	Parallel / Perpendicular	deg	dB	dBµV/m	
No emissions detected that are a product of the transmitter. Emissions shown in the plot are related to the chamber ambient									
Note : Measured Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)									

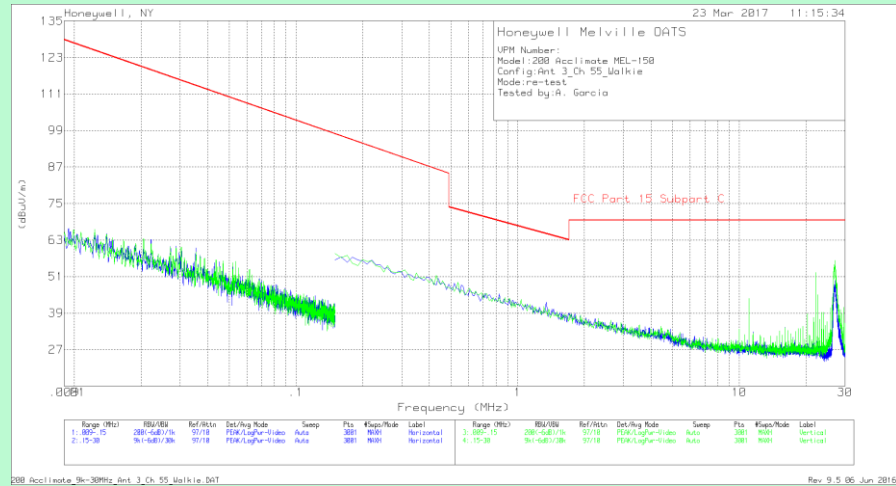
TEST GRAPHS – 9 KHz to 30 MHz (ANTENNA 3)



Channel 1 (903.55 MHz) – Antenna 3



Channel 28 (916.00 MHz) – Antenna 3



Channel 55 (926.45 MHz) – Antenna 3

TEST RESULT – 9 KHz to 30 MHz

Channel	Channel Frequency	Measured Spurious	Quasi Peak	Height	Ant Pol	Azimuth	Margin	Limit @ 3m Distance	Results
#	MHz	MHz	dBµV/m	cm	Parallel / Perpendicular	deg	dB	dBµV/m	
No emissions detected that are a product of the transmitter. Emissions shown in the plot are related to the chamber ambient									
Note : Measured Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)									