

Produkte
Products

Prüfbericht - Nr.: 14041815 002			Seite 1 von 17 Page 1 of 17		
<i>Test Report No.:</i>					
Auftraggeber: <i>Client:</i>		Binatone Electronics International Ltd. Floor 23A, 9 Des Voeux Road West, Sheung Wan Hong Kong			
Gegenstand der Prüfung: <i>Test Item:</i>		Digital Video Baby Monitor			
Bezeichnung: <i>Identification:</i>	MBP38SPU	Serien-Nr.: <i>Serial No.:</i>	Engineering sample		
Wareneingangs-Nr.: <i>Receipt No.:</i>	A000571111-001	Eingangsdatum: <i>Date of Receipt:</i>	23.06.2017		
Prüfört: <i>Testing Location:</i>	TÜV Rheinland Hong Kong Ltd. 3/F., Fou Wah Industrial Building, 10-16 Pun Shan Street, Tsuen Wan, Hong Kong Hong Kong Productivity Council HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of test item at delivery:</i>		Test samples are not damaged and suitable for testing.			
Prüfgrundlage: <i>Test Specification:</i>	FCC Part 15 Subpart C RSS-247 Issue 2 ANSI C63.10-2013				
Prüfergebnis: <i>Test Results:</i>	Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage. The above mentioned product was tested and passed .				
Prüflaboratorium: <i>Testing Laboratory:</i>	TÜV Rheinland Hong Kong Ltd. 3-4, 11/F., Fou Wah Industrial Building, 10-16 Pun Shan Street, Tsuen Wan, Hong Kong				
geprüft/ tested by:		kontrolliert/ reviewed by:			
11.07.2017 David Cheng Datum Test Engineer <i>Date</i> <i>Name/Position</i>		11.07.2017 Benny Lau Datum Senior Project Manager <i>Date</i> <i>Name/Position</i>			
Unterschrift <i>Signature</i>		Unterschrift <i>Signature</i>			
Sonstiges: <i>Other Aspects</i>		Class 2 Permissive Change test report FCC ID: VLJ-MBP38SPU IC: 4522A-MBP38SPU			
Abkürzungen:	P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet		Abbreviations:	P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested	
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.					

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Product information

Manufacturers declarations

	Transmitter
Operating frequency range	2402 - 2479 MHz
Type of modulation	GFSK
Number of channels	23
Channel separation	1 MHz
Type of antenna	Wire Antenna
Antenna gain (dBi)	1 dBi
Power level	fix
Type of equipment	stand alone radio device
Connection to public utility power line	Yes
Nominal voltage	100-240VAC
Independent Operation Modes	Transmitting

Product function and intended use

The equipment under test (EUT) is a 2.4 GHz digital video baby monitor – the Monitor (Parent Unit). It is a wireless LCD display which receives the image and sound from the corresponding camera (Baby Unit). Moreover, it can remotely control the Baby Unit to tilt up or down and pan left or right. It is powered by AC-DC adaptor.

FCC ID: VLJ-MBP38SPU/ IC: 4522A-MBP38SPU

Models	Product description
MBP38SPU	Digital video baby monitor – the Monitor (Parent Unit)

Submitted documents

Circuit Diagram
Block Diagram
Bill of material
User manual
Rating Label

Independent Operation Modes

The basic operation modes are:

- Transmitting mode.
- Normal operation mode

For further information refer to User Manual

Related Submittal(s) Grants

This is a single application for Class 2 Permissive Change.

The corresponding Baby Unit is authorized under the Class 2 Permissive Change procedure (FCC ID: VLJ-MBP38SBU).

Others digital function which is independent from the transmitter is authorized under verification procedure (refer to test report 14043055 002)

Description of the change(s)

Modification made in the certified equipment:

- Replace the rechargeable Battery.
- Replace the Battery charging IC.
- There is change in the size of the battery compartment.
- There is a minor change in the PCB layout to fit the new battery charging IC.
- Add some de-coupling capacitor at LCD signal.
- Remove the ferrite bead on the AC-DC adaptor.

Similarities between the original equipment and the new designed equipment:

- No change in the RF part. RF IC, RF circuit, PCB layout of the RF circuit, RF Antennas are identical to the certified equipment.
- MCU are identical to the certified equipment.
- Functionality and intended usage are identical to the certified equipment.
- Outlook is identical to the certified equipment.
- Rating is identical to the certified equipment.

Engineering Justification

Base on the description of the change(s) provided by the grantee, Conducted Emission, Peak Output Power, Emission Bandwidth, Radiated Emission and Spurious Emission were tested.

No increase in the fundamental emission was found.

Remark

The test results in this test report are only relevant to the tested sample and does not involve any assessment in the production.

Test Set-up and Operation Mode

Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Test Operation and Test Software

Test operation should refer to test methodology.

- During test, Channel & Power Controlling Software provided by the customer was used to control the operating channel, data rate, modulation as well as the output power level. The RF output power was selected according to the instruction given by the manufacturer. The setting of the RF output power expected by the customer shall be fixed on the firmware of the final end product.

Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

- AC-DC adaptor Model: S006AKU0500100 Input: 100-240 VAC 50/60 Hz 200mA Output: 5.0VDC 1000mA) (Provided by the applicant)

Supporting equipment:
MBP38S – Baby Unit (Provided by the applicant)

Countermeasures to achieve EMC Compliance

- Nil

Test Methodology

Radiated Emission

The radiated emission measurements were performed according to the procedures in ANSI C63.10-2013.

For measurement below 1GHz - the equipment under test (EUT) was placed at the middle of the 80 cm height turntable. For measurement above 1GHz - the EUT was placed at the middle of the 1.5 m height turntable and RF absorbing material was placed on ground plane between turntable and measuring antenna. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The investigation is performed with the EUT rotated 360 °, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

All radiated tests were performed at an antenna to EUT with 3 meters distance, unless stated otherwise in particular parts of this test report.

Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

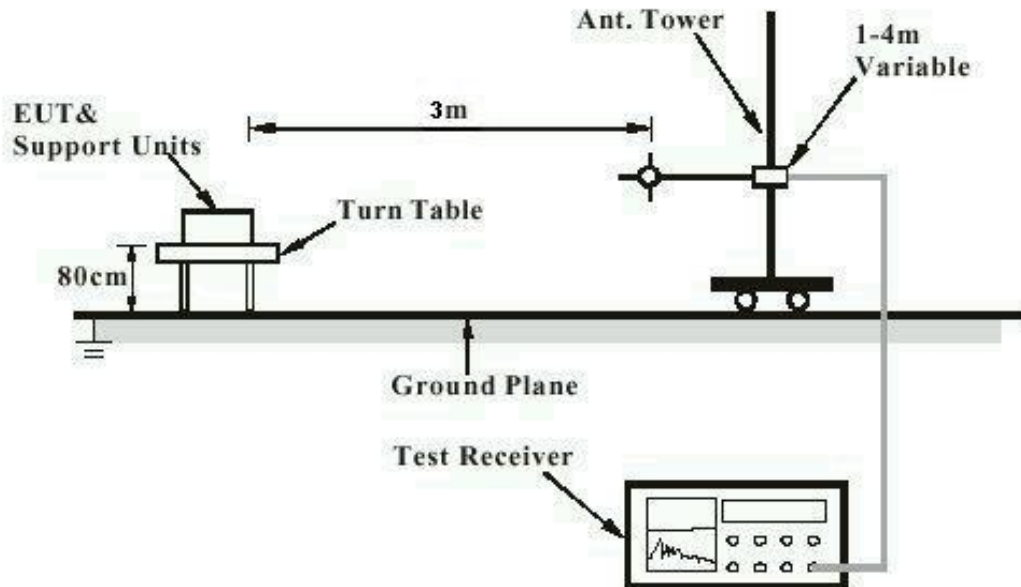
$$FS = R + AF + CF + FA - PA$$

Where FS = Field Strength in dBuV/m at 3 meters.
R = Reading of Spectrum Analyzer in dBuV.
AF = Antenna Factor in dB.
CF = Cable Attenuation Factor in dB.
FA = Filter Attenuation Factor in dB.
PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1 GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

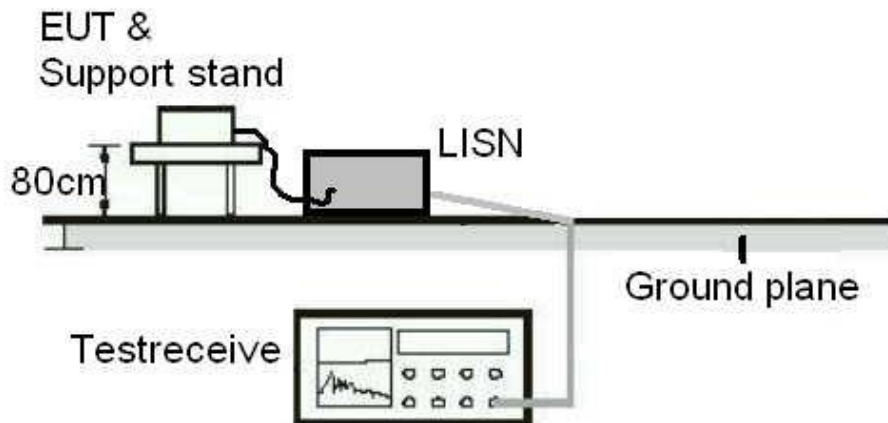
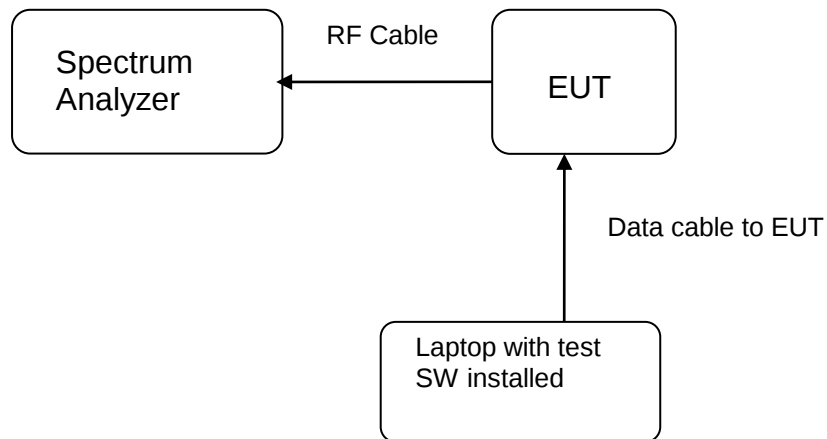


Diagram of Equipment Configuration for Antenna-port Conducted Measurement (if applicable)



List of Test and Measurement Instruments

Hong Kong Productivity Council (FCC/ IC Registration number: 90656/ 4780A-1)

Radiated Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
Semi-anechoic Chamber	Frankonia	Nil	14-Apr-15	25-Apr-18
Test Receiver	R & S	ESU40	12-Aug-15	11-Jul-18
Active Loop Antenna	EMCO	6502	17-May-15	27-Oct-17
Bi-conical Antenna	R & S	HK116	1-Sep-15	1-Sep-17
Log Periodic Antenna	R & S	HL223	1-Sep-15	1-Sep-17
Standard Gain Horn	ETS-Lindgren	3160-07	3-Mar-16	3-Mar-18
Standard Gain Horn	ETS-Lindgren	3160-08	3-Mar-16	3-Mar-18
Standard Gain Horn	ETS-Lindgren	3160-10	3-Mar-16	3-Mar-18
Double-Ridged Waveguide Horn	EMCO	3116	17-Jun-16	17-Jun-18
Double-Ridged Waveguide Horn	EMCO	3117	22-Jun-16	22-Jun-18
Coaxial cable	Harbour	LL335	10-Jun-14	10-Jun-18
High Frequency Cable	Pasternack	PE3VNA4001-3M	27-Jan-17	27-Jan-18
Microwave amplifier 0.5-26.5GHz, 25dB gain	HP	83017A	17-Jul-14	18-Jul-18
Preamplifier 18GHz to 40GHz with cable (EMC656)	A.H. Systems, Inc.	PAM-1840VH	27-Jan-17	27-Jan-18
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	28-Oct-15	28-Oct-17

AC Mains Conducted Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
Test Receiver	R & S	ESU40	11-Jul-17	11-Jul-18
RF Voltage Probe	Schwarzbeck	TK9416	11-Feb-17	11-Feb-18
LISN	R&S	ESH3-Z5	19-Jul-17	19-Jul-18
Double Shield Cable	Radiall	RG142	18-May-17	18-May-19
Pulse Limiter	R&S	ESH3-Z2	3-Jun-17	3-Jun-18

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Radio Test

Equipment	Manufacturer	Type	Cal. Date	Due Date
Spectrum Analyzer	R & S	FSP30	15-Oct-16	15-Oct-2017

Measurement Uncertainty

The estimated combined standard uncertainty for power-line conducted emissions measurements is $\pm 2.42\text{dB}$.

The estimated combined standard uncertainty for radiated emissions measurements is $\pm 4.81\text{dB}$ (9kHz to 30MHz) and $\pm 4.62\text{dB}$ (30MHz to 200MHz) and $\pm 5.67\text{dB}$ (200MHz to 1000MHz) and is $\pm 5.07\text{dB}$ (1GHz to 8.2GHz) and $\pm 4.58\text{dB}$ (8.2GHz to 12.4GHz) and $\pm 4.78\text{dB}$ (12.4GHz to 18GHz)

The estimated combined standard uncertainty for antenna conducted emission is $\pm 2.1\text{dB}$

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for the level of confidence is approximately 95%.

Results FCC Part 15 – Subpart C/ RSS-247 Issue 2

FCC 15.203 – Antenna Requirement 1		Pass
FCC Requirement:	No antenna other than that furnished by the responsible party shall be used with the device	
Results:	a) Antenna type: Fixed Integral antenna b) Manufacturer and model no: N/A c) Peak Gain: 1 dBi	
Verdict:	Pass	

FCC 15.204 – Antenna Requirement 2		Pass
FCC Requirement:	An intentional radiator may be operated only with the antenna with which it is authorized. If an antenna is marketed with the intentional radiator, it shall be of a type which is authorized with the intentional radiator.	
Results:	Only one integral antenna can be used.	
Verdict:	N/A	

RSS-Gen 6.3 – External Control		Pass
IC Requirement:	The device shall not have any external controls accessible to the user that enable it to be adjusted, selected or programmed to operate in violation of the limits prescribed in the applicable RSS.	
Results:	The device does not have any transmitter external controls accessible to the user that can be adjusted and operated in violation of the limits of this standard.	
Verdict:	Pass	

RSS-Gen 8.3 – Antenna Requirement		Pass
IC Requirement:	When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer.	
Results:	a) Antenna type: Fixed Integral wire antenna b) Manufacturer: N/A c) model no: N/A d) Gain with reference to an isotropic radiator: 1 dBi	
Verdict:	Pass	

FCC 15.207/ RSS-Gen 8.8 – Conducted Emission on AC Mains						Pass
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Port of testing : AC Mains input port of power supply Detector : Quasi-peak and Average Supply voltage : 120Vac 60Hz Temperature : 23°C Humidity : 50%						
Requirement: 15.207(a)/ RSS-Gen 8.8						
Results: Pass						
Live measurement						
Frequency range (MHz)	Frequency (MHz)	Quasi-peak dBµV	Average dBµV	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0,15 – 0,5	No peak found	---	---	66 - 56	56 - 46	Pass
> 0,5 - 5	No peak found	---	---	56	46	Pass
> 5 - 30	No peak found	---	---	60	50	Pass
Neutral measurement						
Frequency range (MHz)	Frequency (MHz)	Quasi-peak dBµV	Average dBµV	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0,15 – 0,5	0.454	41.8	33.6	66 - 56	56 - 46	Pass
> 0,5 - 5	No peak found	---	---	56	46	Pass
> 5 - 30	No peak found	---	---	60	50	Pass
Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz does not exceed the limits. For test Results plots refer to Appendix 1						

FCC 15.247 (b)(1)/ RSS-247 5.4(2) – Peak Output Power			Pass
Test Specification : ANSI C63.10 – 2013 Mode of operation : Tx mode Port of testing : Temporary antenna port Supply voltage : 120VAC Temperature : 23°C Humidity : 50%			
FCC/ IC Requirement : For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 Watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 Watts.			
Results: For test protocols please refer to Appendix 1.			
Frequency (MHz)	Maximum peak output power (W/dBm)	Limit (W/dBm)	Verdict
2402	0.023 / 13.61	0.125 / 21.0	Pass
2440	0.021 / 13.12	0.125 / 21.0	Pass
2479	0.024 / 13.85	0.125 / 21.0	Pass

FCC 15.247 (a)/ RSS-247 5.1(1) – 20 dB Bandwidth			N/A
FCC/ IC Requirement : N/A			
Test Specification : ANSI C63.10 – 2013 Mode of operation : Tx mode Port of testing : Temporary antenna port Supply voltage : 120VAC Temperature : 23°C Humidity : 50%			
Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types. For test protocols refer to Appendix 1.			
Frequency (MHz)	20 dB left (MHz)	20 dB right (MHz)	20dB bandwidth (MHz)
2402	2400.87	2403.19	2.32
2440	2438.85	2441.25	2.40
2479	2477.84	2480.28	2.44

RSS-Gen 6.6 – Occupied Bandwidth			N/A
FCC/ IC Requirement : N/A			
Test Specification : RSS-Gen Mode of operation : Tx mode Port of testing : Temporary antenna port Supply voltage : 120VAC Temperature : 23°C Humidity : 50%			
Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types. For test protocols refer to Appendix 1.			
Frequency (MHz)	Left (MHz)	Right (MHz)	99% bandwidth (MHz)
2402	2400.97	2403.10	2.13
2440	2439.96	2441.15	2.19
2479	2477.95	2480.18	2.23

FCC 15.247 (d)/ RSS-247 5.5 – Spurious Conducted Emissions				Pass	
Test Specification : ANSI C63.10 – 2013 Mode of operation : Tx mode Port of testing : Temporary antenna port Supply voltage : 120VAC Temperature : 23 °C Humidity : 50 %					
FCC/ IC Requirement: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.					
Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types. There is no peak found outside any 100kHz bandwidth of the operating frequency band in the three transmit frequency. All three transmit frequency modes comply with the limit stated in subclause 15.247(d). For test protocols refer to Appendix 1.					
Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2402	2400.000	-21.11	10.59	31.70	Pass
2440	24568.000	-20.65	10.24	30.89	Pass
2479	2483.500	-32.26	9.55	41.81	Pass

FCC 15.205/ RSS-Gen – Radiated Emissions in Restricted Frequency Bands		Pass
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Supply voltage : 120VAC Temperature : 23°C Humidity : 50%		
FCC Requirement: In any 100kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in section15.205(a), must also comply with the radiated emission limits specified in section 15.205(c).		
IC Requirement: Spurious emissions from licence-exempt transmitters shall comply with the field strength limits shown in RSS-Gen table 5. Unwanted emissions falling into restricted bands of Table 3 shall comply with the limits specified in RSS-Gen. Unwanted emissions not falling within restricted frequency bands shall either comply with the limits specified in the applicable RSS, or with those specified in RSS-Gen.		
Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. All three transmit frequency modes comply with the field strength within the restricted bands. There is no spurious found below 30MHz.		
Mode: 2402MHz TX Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2390.000	49.89	74.0 / PK
2390.000	39.32	54.0 / AV
4802.948	53.31	74.0 / PK
4802.948	40.92	54.0 / AV
7207.371	63.66	74.0 / PK
7207.371	52.11	54.0 / AV
Mode: 2402 MHz TX Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2390.000	48.66	74.0 / PK
2390.000	35.72	54.0 / AV
4802.948	52.87	74.0 / PK
4802.948	41.45	54.0 / AV
Mode: 2440 MHz TX Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
162.048	34.60	43.5 / QP
192.060	27.60	43.5 / QP
255.890	30.10	46.0 / QP
600.182	36.80	46.0 / QP
4880.128	53.84	74.0 / PK
4880.128	40.51	54.0 / AV
Mode: 2440 MHz TX Horizontal Polarization		

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
162.048	30.80	43.5 / QP
648.198	36.30	46.0 / QP
864.264	37.30	46.0 / QP
4880.128	54.64	74.0 / PK
4880.128	40.94	54.0 / AV
Mode: 2479 MHz TX Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2483.500	56.68	74.0 / PK
2483.500	46.31	54.0 / AV
4956.618	55.20	74.0 / PK
4956.618	43.07	54.0 / AV
Mode: 2479 MHz TX Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2483.500	54.43	74.0 / PK
2483.500	43.21	54.0 / AV
4956.618	55.57	74.0 / PK
4956.618	42.92	54.0 / AV